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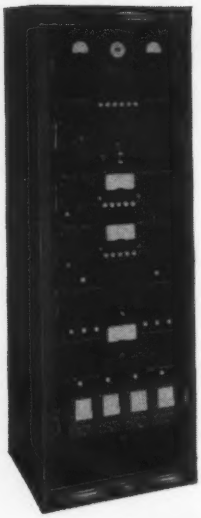

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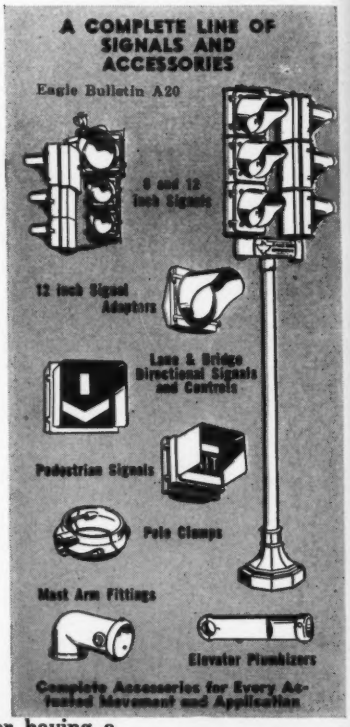
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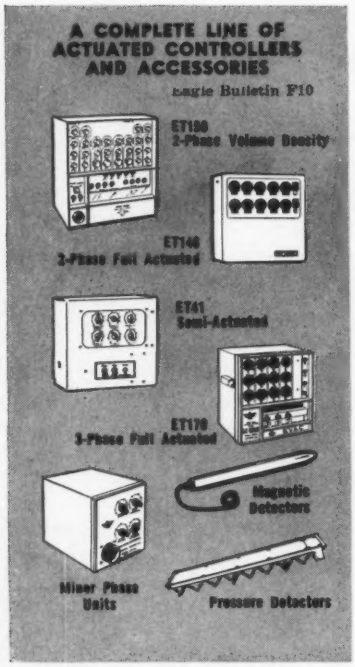


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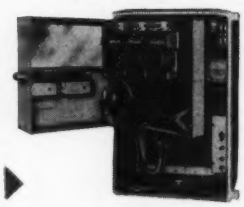

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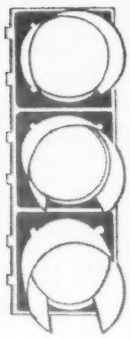

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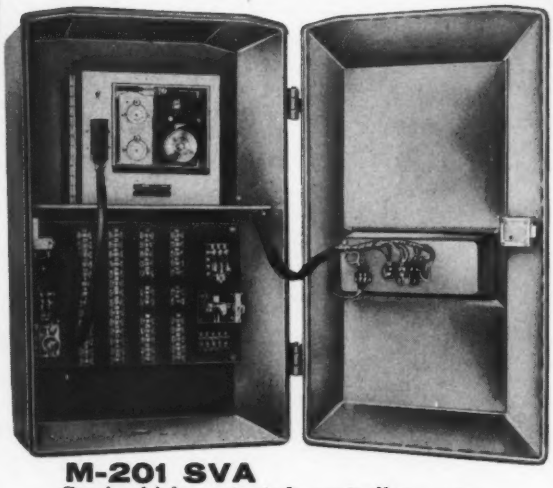

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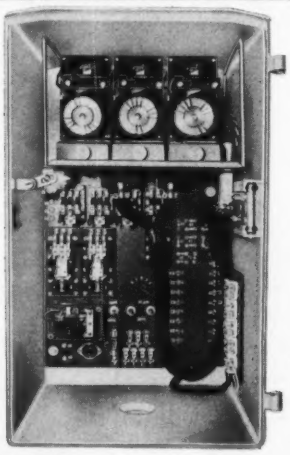

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**Cover: Parking at the fairgrounds at Indianapolis during the State Fair. Note the use of the infield and also the number of transit vehicles in the right foreground.**
Photo from Indianapolis Traffic Engineering Bureau

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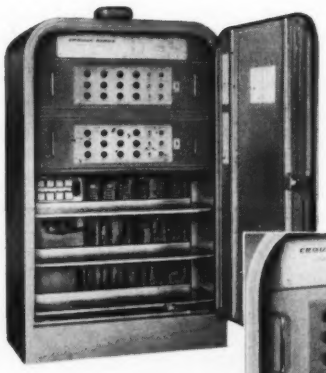

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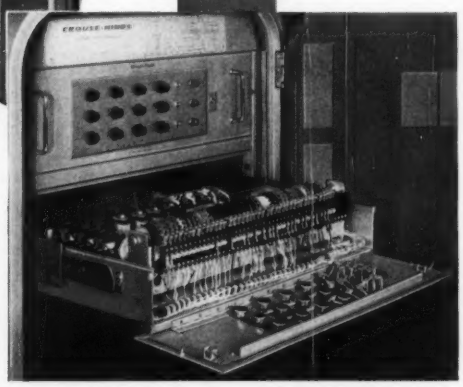

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# Frankly Speaking . . .

THE FIRST WORLD TRAFFIC ENGINEERING CONFERENCE is now history. The Institute of Traffic Engineers should feel honored and grateful for the large attendance and the participation by other countries.

The exchange of information at the International Sessions was very beneficial. Of great interest was the noticeable similarity of traffic and transportation problems in all countries of the world. There are differences, to be sure, but the same basic traffic engineering techniques and solutions appear over and over.

This Conference should be only the beginning of a new era of international cooperation and coordination in this field. Ways need to be explored now for the furtherance of this effort, with its resulting worthwhile contacts and exchange of information.

An excellent step in this direction would be for a large number of Institute members to plan to attend the Sixth International Study Week in Traffic Engineering, scheduled to be held in Salzburg, Austria, September 10 to 14, 1962. What better vacation, for instance, could you imagine than a trip to this beautiful area of Europe, combined with the stimulating experience of an international traffic engineering program?

ROBERT A. BURCH
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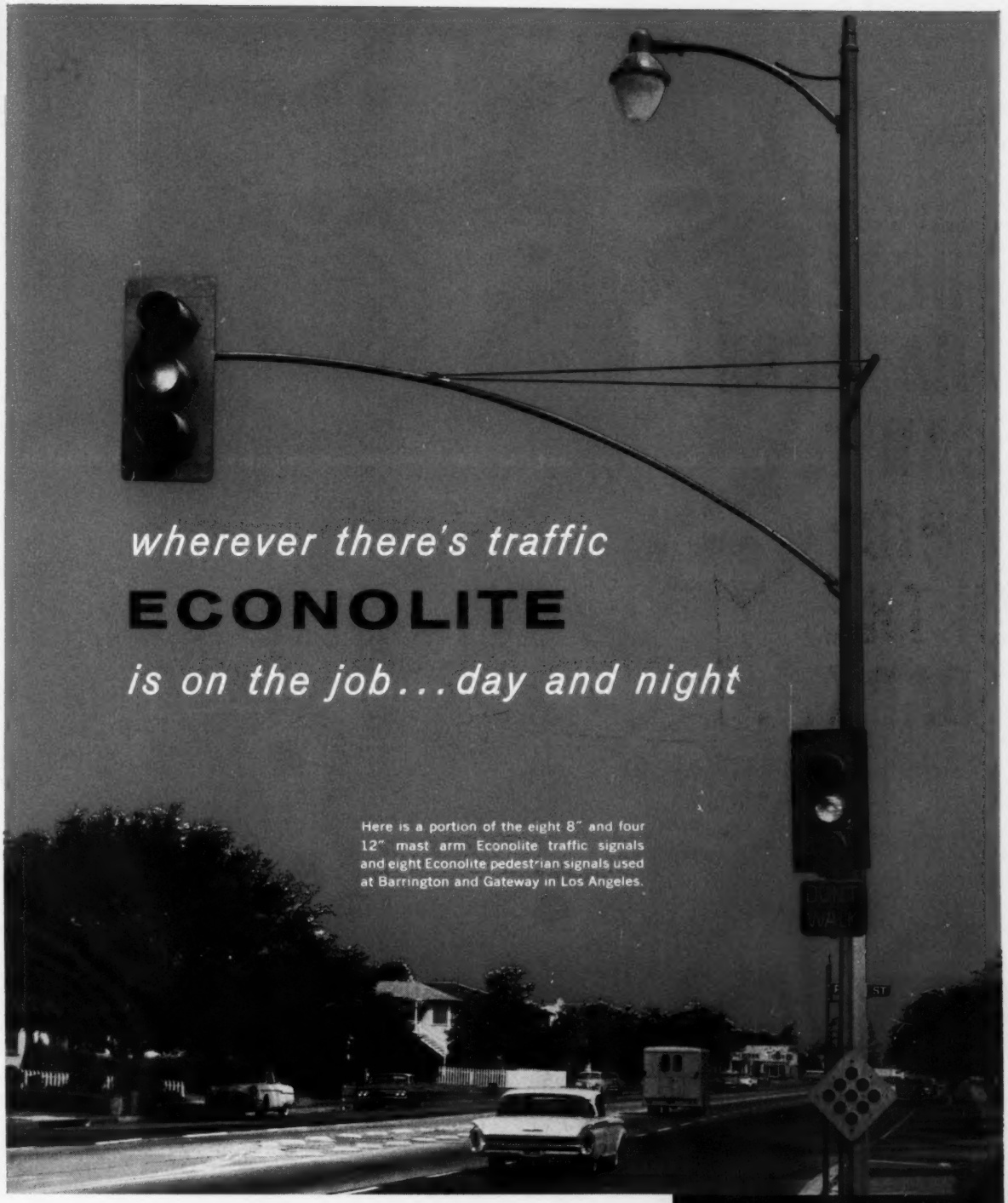


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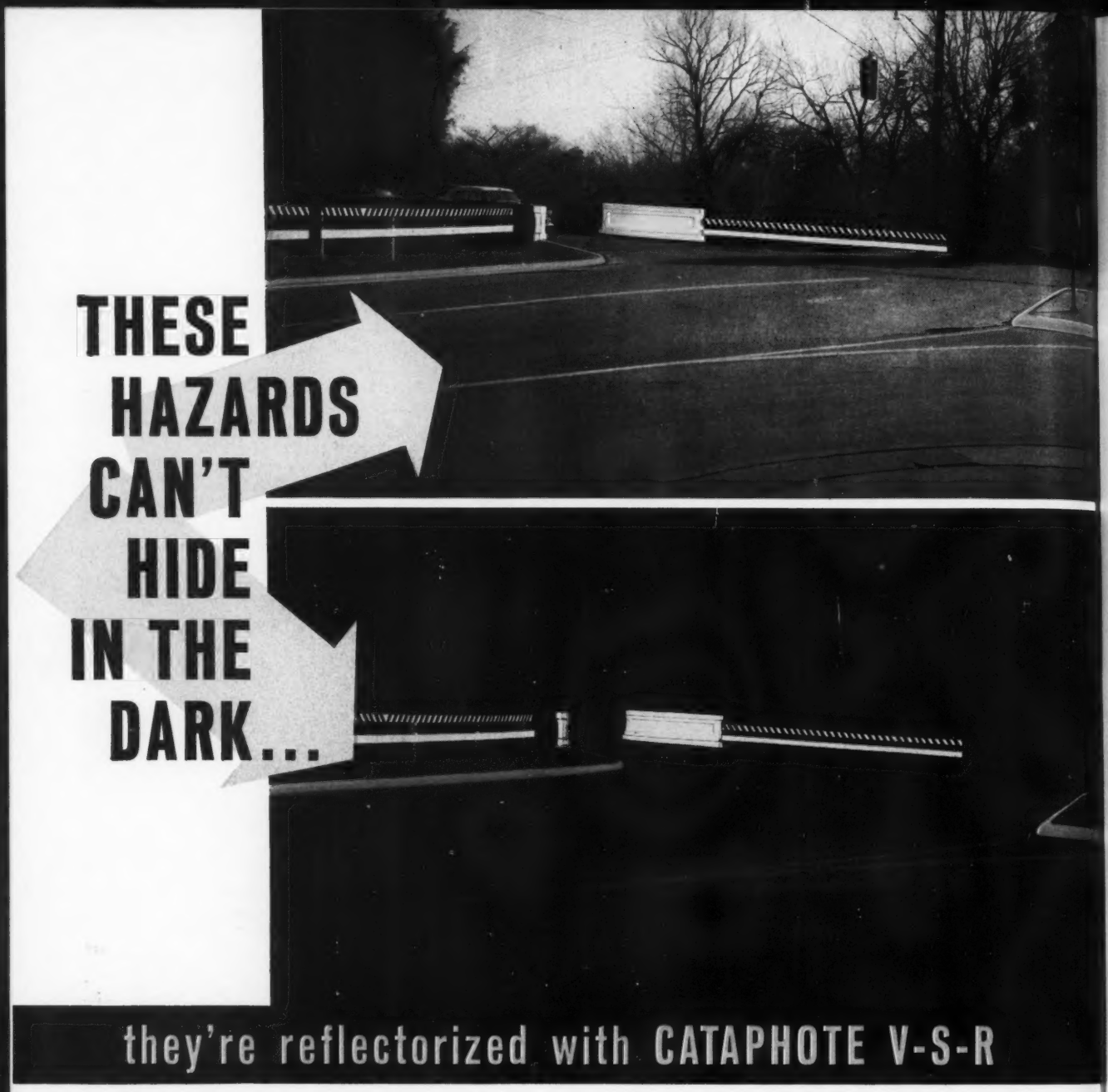


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## *The Matson Award Paper*

# Determination of Discontinuities in Traffic Flow as a Factor in Freeway Operational Control

By John L. Barker
Director of Research
Automatic Signal Division
Laboratory For Electronics, Inc.
Norwalk, Conn.

This paper was presented in response to the 1961 Theodore M. Matson Memorial Award at the 31st Annual Meeting of the Institute of Traffic Engineers, Washington, D. C., August 21, 1961.

THIS PAPER COVERS some aspects of the area between the microscopic and macroscopic nature of traffic flow.

In the past, considerable study has been made of individual headways and speeds, and their relationship with respect to traffic lane production and performance. A number of theoretical formulae have been developed to describe these relationships. This is a valid approach, but to produce an operational control system, a large amount of analysis of the individual characteristics of each vehicle is required. Conversely, considerable data has been collected on the gross production and performance of vehicle flow; this includes hourly volumes, daily volumes, speed distribution surveys, and other long term measurements of past happenings. These parameters, as such, are generally too coarse to be used for operational control.

Recent work has been done on continuous volume rate, speed average, and density measurements; but this work has been more or less on a spot location basis and, while capable of producing results, requires more hardware than can be justified in all but the most acute cases of need for operational control. In effect, we are faced with the selection of a system which unquestionably would be quite complex and costly, or a system which may be relatively simple and inexpensive, but too sluggish or general in nature to provide the necessary finesse for good control. This study has been undertaken to determine whether continuous short term or intermediate term measurements of traffic parameters may be utilized to produce an output which may be used for direct operational control.

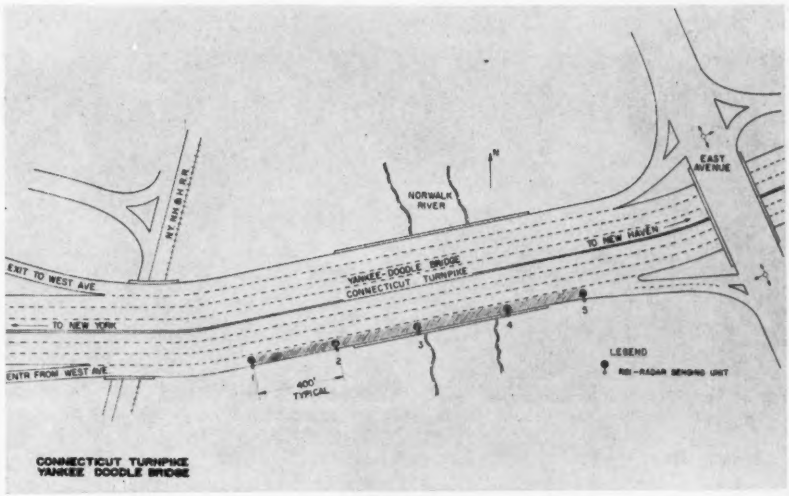



**Figure 1**
**Schematic of test area.**

The general approach to the problem is to measure one of the parameters, speed, volume or density, at a selected station along a lane of travel. Next, a measure is made of the same parameter at a second station further down the lane. The pattern measured at the first station is delayed or projected by the travel time between stations. It is then compared with the pattern as it is being measured at the second station. Any irregularity in the flow between the two stations will be shown in the running difference of the two patterns. This process would be repeated down the length of roadway with the parameter pattern being projected from one station to the next for comparison.

The pattern may be any of the three traffic parameters, volume, density, or speed, measured as a continuously changing variable with respect to time. For example: volume would be measured in vehicles per hour and considered as a rate of flow. The time base for the *rate* measurement might be of the order of one minute. This rate of flow, or volume measurement, shows quite clearly the time distribution of traffic.

The test area is shown in schematic form in Figure 1.

Selection of the general test location was made with the following in mind:

(1) Something other than idealized traffic flow of all vehicles at the same speed is desired to determine confidence and response which might be expected in the projection of the traffic parameter from one station to the next.

(2) The location should be accessible to allow visual observation and evaluation.

(3) The test location should be such that it may be used as one large test section, or as a number of small ones.

The conditions allow for evaluation of the confidence factor to be expected in the comparison of the projected parameter with respect to the size of

Figure 2
Photo of test area showing sensing location.

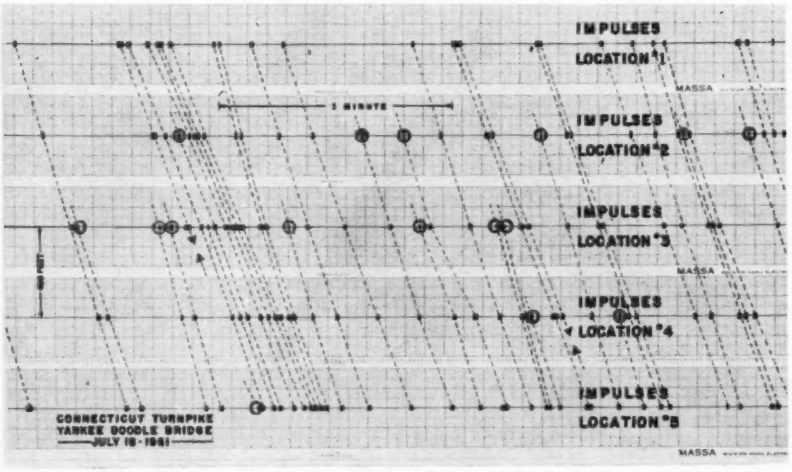



Figure 3
Time distribution of vehicles at successive locations.

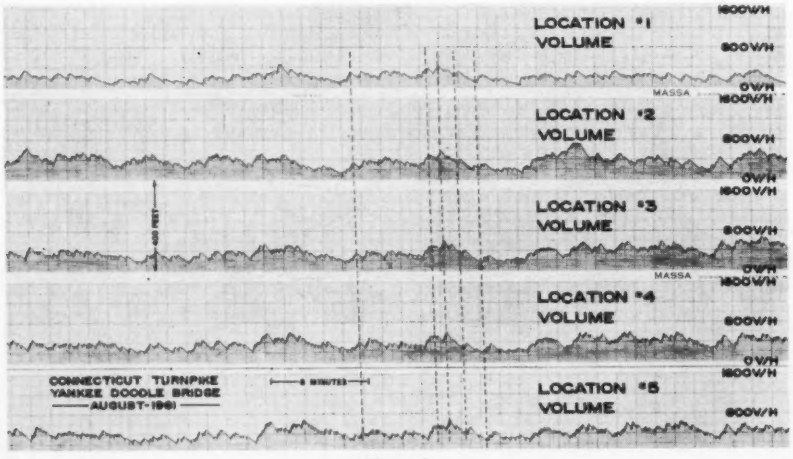



Figure 4
Volume traces at successive locations.

the zone between the sensing stations, changes in speed of vehicles, weaving maneuvers, etc.

In co-operation with the Connecticut State Highway Department, the right-hand lane of the Yankee Doodle Bridge of the Connecticut Turnpike over the Norwalk River was selected as a test site as shown in Figure 1 and Figure 2. Figure 2 is a photograph of the test site showing the flow of vehicles towards the camera on the left hand side of the photo. In this area, an extra lane has been provided on the Turnpike to accommodate the high level of local traffic desiring to cross the Norwalk River; with an "on" ramp just ahead of, and an "off" ramp just at the end of the test section. The center portion of the section between the two interchanges is approximately 1600 feet in length. The outer lane in this section was instrumented with 5 sensing units located approximately 400 feet apart. Speeds in the area are about 40 m.p.h. There is a significant amount of merging between the lane under test and the adjacent through lane, due to ramps.

Figure 3 is a chart showing the arrival of the vehicles at five successive stations disposed approximately 400 feet down lane with respect to each other. The top trace shows the arrival of the vehicles at the first sensing station; the second trace, the arrival at the second sensing station, etc. Lines have been drawn across the chart to show the progression of vehicles through the five stations. It is interesting to note that the general pattern remains quite the same, in spite of the entrance and exit ramps in the immediate vicinity of the test section.

For the purpose of showing the general aspects of this system, volume has been selected as the parameter of flow, since it is easy to visualize, and requires a minimum of equipment.

Figure 4 shows the volume traces for the successive locations. The displacement of the traces from one station to the next can be noted as well as the preservation of the pattern of the trace for the groups of vehicles as they traverse the test section. The time scale in Figure 4 is different from that of Figure 3, hence the slope of the speed scale is different. It will be noted that each particular grouping of vehicles has its own particular volume trace and that this volume trace shape may be projected down lane on the roadway in exactly the same manner as

Figure 5
Radar sensing location.

might be done for individual or small groups of vehicles.

A selection must be made in the value of the time base of the parameter commensurate with the speed and distance between two sensing stations. Short time bases of ½ to 1 minute will give detail which will show individual cars. Long time bases will produce a volume trace in which the curve will be smoothed out somewhat. If the sensing stations are located just a few hundred feet apart, a volume trace with a short time base could be used to practically insure that each vehicle travels uniformly through the distance between the stations, and that there will be little material change in the distribution pattern of the vehicles with respect to each other. For sensing station spacings of intermediate lengths, say 1200 feet to 2400 feet, some loss of sensitivity may result due to lane changing, speed distributions, etc., causing some changes in the time distribution of the vehicles. However, patterns are materially changed in the event of any irregularities or discontinuities of traffic flow between the stations.

A number of charts have been marked with "o"s and "arrows" to show vehicles entering the test lane and leaving it, respectively.

The vehicle sensing in the test area was by Radar Sensing Units, as these provide information relative to both vehicle passage and individual vehicle speeds. Conventional radar or other types of detectors might also be used. Figure 5 is a photograph of a typical installation of a radar sensing unit.

The outputs of the radar sensing units were connected over leased telephone lines for evaluation in the Development Laboratory approximately ¾ of a mile away. The evaluating equipment consisted of speed and impulse translators connected to each radar sensing unit circuit. The speed and impulse translators provided impulse data and speed data for vehicles passing each sensing station. Figure 6 is a photograph of a speed and impulse translator.

The desirability of comparing either density, speed or volume, during the tests, indicated the use of density computers for each sensing location, as these computers also provide "Volume" and "Average Speed" outputs. Figure 7 is a photograph of this unit.

Traffic flow analyzers were connected between adjacent pairs of density computers. These units receive, as an input, the electrical data corresponding to the parameter being measured at the "in" sensing point of a section. This continuously varying parameter is stored and then repeated at a time corresponding to the theoretical arrival of the vehicles at the second sensing location. The stored parameter is then compared with the actual parameter as it is being received at the second location. Figure 8a is a photograph of a traffic flow analyzer. Figure 8b is a photograph of the complete rack of test equipment.

In the comparison of volume as the parameter, the criterion for normal flow is that the output volume must be equal to, or very close to, the input

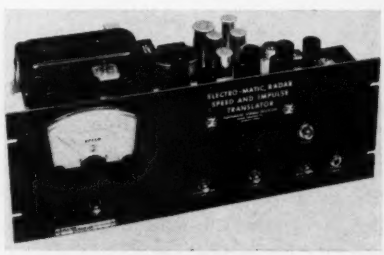


Figure 6
Speed and impulse translator.

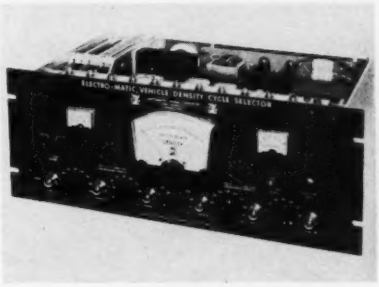


Figure 7
Density computer.

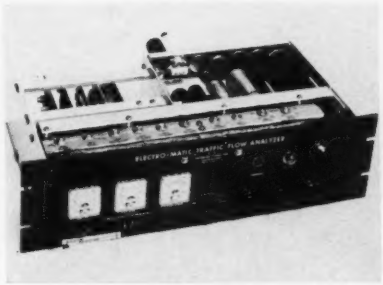


Figure 8A
Traffic flow analyzer.

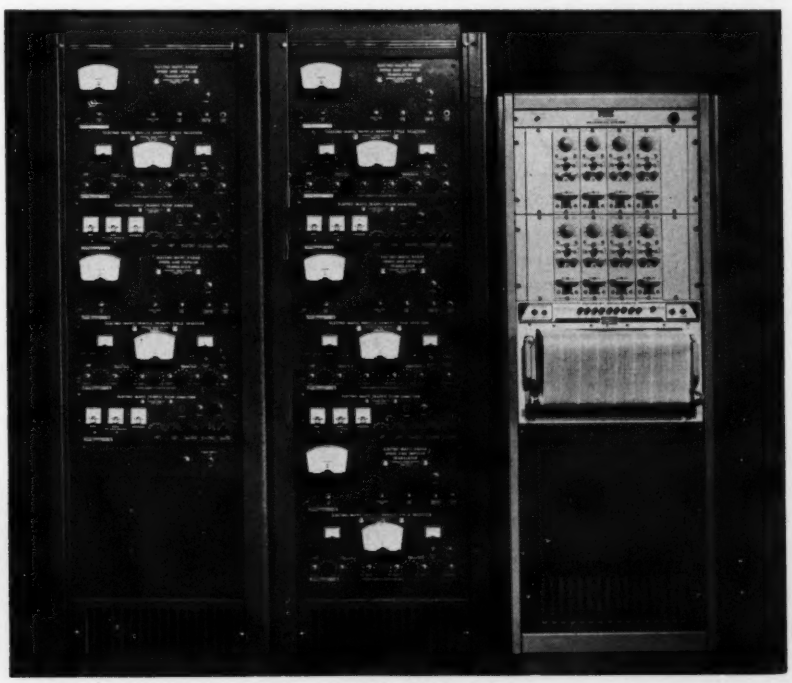


Figure 8B
Test equipment set up.

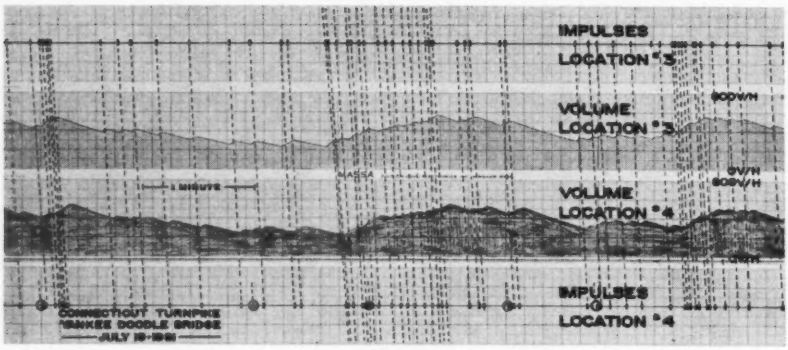



Figure 9
Detail of vehicle distribution and volume trace.

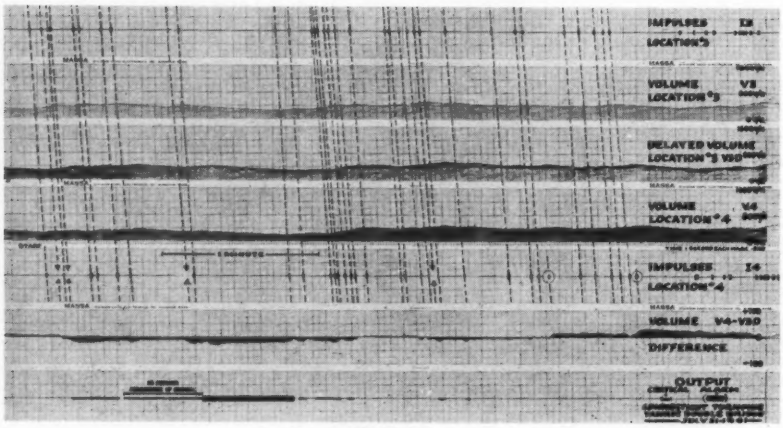



Figure 10
Comparison of projected input and output traces.

volume. If there has been a stoppage or discontinuity in the flow, the output volume will be less than the projected input volume and the difference will cause the equipment to indicate a "Critical" condition; and after a selected time period, operate an alarm unit.

A simultaneous comparison of volumes between input and output would be satisfactory only while flow is at a fairly uniform volume level. A sudden increase in volume rate at the input station would show a serious difference between input and output volumes, triggering the critical-alarm unit needlessly, since the output is handling all of the volume reaching it. Conversely a pronounced decrease in volume rate at the input will be compared with a greater flow rate at the output, indicating a safe condition even though the output end may be handling only enough vehicles to compensate for those entering the system, and not enough for all those vehicles presently within the system between the input and output detectors.

Instead, the comparison between input and output is delayed until the increased (or decreased) volume rate should have progressed to the output station. A comparison at this time indicates whether the output volume is as much as expected.

To take care of short term "Critical" conditions which might exist due to the variability of traffic flow of individual vehicles, a persistence of the "Critical" condition for a minimum time is required before an output "Alarm" is given.

One of the first test runs was made to determine if the parameter pattern could be measured and then accurately projected from one location and compared with the pattern at the next locations. Most of these tests were made between Stations 3 and 4. The traffic between these two stations had somewhat less weaving and, in general, was more uniform in its flow characteristics. While no measurements have been made for the analysis carried out, the amount of weaving in this area is materially greater than would be experienced in normal free flow high type facilities. The spacing between test Stations 3 and 4 is approximately 400 feet, and the average speed about 40 m.p.h.

Figure 9 shows graphically the results of this test for a few minutes run; this is typical of many hours of observation. Many salient characteristics of this method of traffic flow analysis can be seen on this trace. The top trace shows the time distribution of the "Impulses" of vehicles as they pass Station 3. The second trace is the running "Volume" at Station 3. Full scale corresponds to 800 V.P.H. and the time base of the "Volume" computation is one minute. Trace No. 4 corresponds to the "Volume" pattern at Sensing Station 4, and the fifth pattern shows the time distribution of "Impulses" at Station 4. Diagonal lines have been drawn for specific vehicles through the points at which they produce an impulse at Station 3 and Station 4 to show continuity of flow, ease of identifying the sensitivity of the volume traces to individual vehicle impulses, and also the amount of weaving, etc.

Figure 10 shows graphically the results from a series of tests to determine specifically the accuracy to which the input volume could be projected or delayed to match the output volume. The first trace on Figure 10 shows the time distribution of the vehicles at Location 3. The second trace shows the volume as measured at location 3. The third trace is the delayed volume trace for location 3 which is then compared directly with trace number 4, the measured volume trace at location 4. The fifth trace shows the impulse distribution at sensing station number 4. The sixth trace shows the difference between the output volume and the delayed input volume. Where the difference is plus with respect to the zero center line, the output is equal to or greater than the input, and a normal condition of flow exists. Where the traffic is such that the delayed input is greater than the output, the trace is minus and shows a critical condition. There is a minimum value of 20 vehicles per hour to the negative measurement which must be exceeded before the critical condition is indicated. Trace number 7 shows the action of the "Critical" and "Alarm" circuits.

The effect of a car leaving the traffic stream can be seen by examination of points with open arrows, and on the difference trace No. 6. Note that this leaves only a semi-permanent minus difference which gradually is lost over two or three minutes under the measurement conditions. The primary factor in this restoration to zero is the time base of the volume compu-

tation. The shorter the time base, the sooner the computation will reach a new, correct running average. As will be discussed more fully in the next few paragraphs, any control which would be operated on the difference calculation, probably would be set at some minimum critical level greater than the difference produced by the removal of one vehicle from the stream of traffic.

The effect of a vehicle entering the stream is shown by circles on the trace. Note, again, the difference trace persists for about a minute, at which time the plus difference disappears. This rate of restoration is also a function of the time constant of the volume calculation.

The worth of a system of this type is intimately tied in with the degree of difference and the proportion of time the critical condition exists during the period under consideration. Normal weaving will cause a certain amount of unbalance between input and output volume. It is possible to determine a confidence level that might be placed on a critical indication as meaning that the flow has been modified by other than a normal weaving maneuver. A number of 24 hour tests were run which show that the critical indication can be kept within practical limits.

Observations show that the system loses sensitivity when the traffic flow rate is less than one vehicle per minute under the weaving conditions observed at this site.

Additional stability may be achieved in the system through the requirement of the persistence of the critical indication for some minimum time before an output or alarm condition is provided by the equipment. For example, on Figure 10 it will be noted that there are a number of points where the difference trace caused a critical condition to be shown, but only for periods of the order of 5 to 20 seconds. These differences were, by and large, one car differences in the patterns. With the time of persistence requirement on the critical condition before an alarm is given, only major changes in the traffic pattern persisting for 30 seconds or more, caused an alarm output.

The period of persistence before the critical condition triggers the alarm output would be dependent to a large degree on the sensitivity setting of the critical difference. The equipment resets the persistence timing period each time the critical condition ceases, even for very short periods of time. Long periods of critical persistence would offset very sensitive critical difference settings. Conversely, if reasonably large pattern differences are tolerated before a critical indication is given, relatively short periods of persistence of the critical condition could be used before the output alarm would operate. In most of the experimental testing, periods of persistence of approximately 30 seconds were used, which appeared to be a good starting point for operation of a system of this type. Selection of the compromise of the two will have to be optimized through field experience.

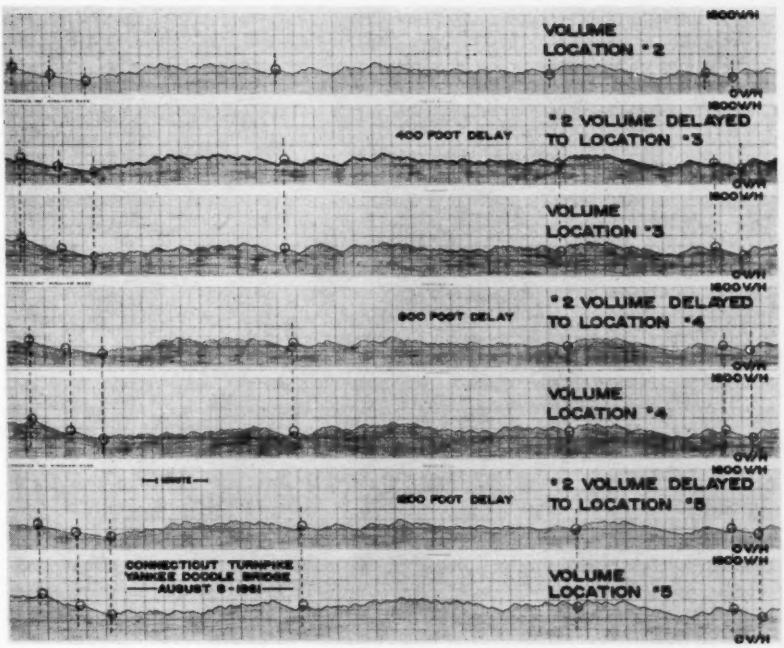



**Figure 11**
**Effect of size of zone between sensing stations.**

It is reasonable to assume that there might be cases where the number of vehicles checking out is less than the number of vehicles checking in, thus causing a critical condition. In such cases, to increase the stability of the system, some portion of the excess traffic checked out should be returned to the output location before the system is restored to a non-critical condition. For example, if an output pattern suffers a discontinuity to the extent that three vehicles do not check out in the volume measuring period and cause the critical difference to be indicated, then, at least two vehicles at some time later must be returned to the system in the volume measurement at the output location before the "Alarm" indication can be released for this zone.

To test how far it might be possible to project the pattern from one point for comparison at a second point, an experimental arrangement was established between Sensing Stations 2, 3, 4, and 5. The parameter chosen was volume. The pattern at Station 2 was compared with that at Station 3, 400 feet down lane, with that at Station 4, 800 feet down lane, and with that at Station 5, 1200 feet down lane. It should be recalled that there is a marked amount of weaving in this area, much beyond that which might be expected under normal free flow conditions not involving exit and entrance ramps. Most of this is traffic entering the test section desirous of exiting at the "off" ramp, and accounts for the increase in absolute magnitude of the volumes at the down lane stations.

The results of the variation in distance between sensing stations is shown in Figure 11. The top trace shows the volume at Sensing Station 2, and becomes the input data for the traffic flow analyzers located at Stations 3, 4, and 5 respectively.

Trace No. 2 shows the input projected or delayed trace, as it is expected to arrive at Station 3. The similarity between this trace and the actual volume trace at Station 3 is clear and shows that a 400 foot spacing is not too large even for projected pattern

comparison under severe weaving conditions.

Trace No. 4 represents the original Trace No. 2, delayed by the travel time to Station 4. This point is 800 feet down lane from Station 2, yet the pattern similarity and time coincidence still show remarkable similarity.

The sixth trace shows the delayed input trace from Station 2 as it is expected to arrive at Location 5, 1200 feet down lane. It is significant that even though the amount of traffic leaving the Turnpike at the exit ramp has increased materially, the absolute value of the volume at Location 5 nevertheless, shows significant similarity exits between Traces 6 and 7, corresponding to the projected volume of Location 2 to Location 5, and the actual measured volume at Location 5.

The results from this test of the effect of the zone size on the projection of the pattern from input to output seems to indicate that at least 1200 foot zones may be used where normal traffic speeds are of the order of 30 to 60 miles per hour, and there is no serious effect from exit or entrance ramps in the immediate vicinity. Experimentally, the maximum size of the zones has not been determined as the test section was influenced by ramp traffic.

Three factors can be added to improve the finesse of the system. They compensate for the difference in absolute value and time of delay between stations to provide closer agreement of the two traces:

1. Accuracy of pattern comparison can be improved by addition of automatic speed of travel control to the traffic flow analyzer which determines the expected time of arrival of a given pattern at a station down lane from the actual speed of the vehicles. Naturally, if the pattern is moving at 40 m.p.h., the delay of the pattern for comparison at the second station should be shorter than if the pattern was moving at 30 m.p.h. The equipment has provision for making this more sophisticated adjustment in the projection time of the pattern. Most tests were run on manual selection of the delay time.

2. Since the two patterns may resemble each other, but differ only in absolute magnitude, one pattern may be scaled with respect to the other and still maintain shape conformity for comparison. In the case shown in Figure 11, it is clear that had the output volume at Station 5 been scaled to 70% of its measured value, the traces for projected Station 2 volume, and Station 5 volume, would have been in very close agreement.

3. A second means of scaling the input or output would be by the subtraction of a constant from either the input or output. This maintains the complete profile of the trace for comparison purposes. A constant subtraction or addition provides a simple means or setting the threshold level for the initial critical indication.

The equipment, as used in the tests, was capable of modifying either the inputs or outputs by a per cent scaling factor, as discussed in the above Paragraph 1, and capable of inserting fixed differentials in the absolute values as discussed in Paragraph 2. Limited experimental time did not allow testing of various settings for these adjustments.

The economics of any system must always be considered. It is interesting to note that in the use of volume as the projected parameter, it is not necessary to limit the system to a per lane comparison of patterns. The volume pattern from a pair of lanes will have nearly as much personal identity as that from a single lane. Therefore, a system based on a comparison of patterns can be operated on a two or more lane basis of volume comparison. The system would have more finesse on a per lane basis and with sensing stations closely spaced, but practical considerations might dictate that the distances between sensing stations should be made as large as possible, and, that combinations of lanes be treated as a unit.

As a cautionary note, where the pattern represents the combination of two lanes, the system may lose sensitivity at low volumes. As an example, if two lanes are combined to provide the input data for a volume pattern projection, the detection of a discontinuity in the stream may depend on whether the volume rate for both lanes is over the capacity of one of the lanes. If one lane could carry the traffic, the output might not be significantly changed by a discontinuity.

As discussed, a discontinuity has been indicated as critical in a zone when the output volume is less than the delayed input volume. After critical has been indicated and an alarm condition shown, the system must automatically be returned to normal when traffic again flows freely. To release a system in this mode of operation, the requirement would be that the output volume equal or possibly exceed the input showing that the discontinuity has been cleared.

In the case of complete stoppages, each zone will show critical as its output will fall to zero before the delayed input falls to zero. Therefore, the control system is stable.

Density, as a parameter for projected comparison, may be considered under two different modes of operation:

1. If the mode requires that the projected input density should be higher than the output density to indicate critical, the traffic condition reflected is a discontinuity in the zone, i.e., between the two stations. To clear the system, the requirement would be that the input projected density return to slightly lower than or the same value as the output density.

Under this mode of operation, shock waves or stoppages, traveling up lane will not be detected at any but the originating zone, as the output densities will always build up before the input densities.

2. If the mode requires output density higher than the projected input density to indicate a critical condition, the traffic condition reflected is a backup coming up lane into the zone. That is, a discontinuity is located in the next zone down lane. It may or may not be indicated in the zone in which it occurs but will be in all up lane zones. The indications could be transposed one zone so that the operator would be correctly informed.

To release a system in this mode, the requirement would be that the output density fall below or approximately equal to the projected input density.

This mode is stable and has the added advantage of showing the depth of the problem as critical indications will be shown in each zone that has a backup in it. It will also show shock waves. The zone will be specified as clear as soon as the output traffic begins to move again.

"Average Speeds", as used in these tests, is a running arithmetic average of the speed of the vehicles during the last minute. The number of vehicles over which the speed is averaged is proportionate to the volume of traffic in vehicles per minute. There is an exponential weighting of the speeds of the last cars which shows speed trends more significantly. Therefore, it is pos-

sible to use this time base in the average speed measurement, the only requirement being that there is enough sensitivity to measure the average speed changes.

Average speed as a parameter for projected comparison also may be operated under two different modes:

1. If the requirement in this mode is that the projected input average speed is lower than the output average speed to indicate a critical condition, the traffic is slowing down at the input due to a discontinuity in the zone between the two sensing stations. To clear a system in this mode the requirement would be that the projected input average speed equal or approximate the output average speed.

In this mode, the only zone which will show the impediment is the one in which the discontinuity occurs. Other zones up lane will have their output speeds lowered before their input speeds and will not show critical.

2. The second mode of operation with average speed would require that the output average speed be lower than the projected input average speed to indicate critical. This mode requires a backup from the next zone down lane to produce a critical indication. It would be cleared by having the output run higher or almost as high as the projected input average speed.

This mode is stable under complete stoppages, and gives an indication in each zone as the shock wave or stoppage is propagated back from the discontinuity.

In both Mode 2 for density, and Mode 2 for speed, the critical condition is influenced by the effect of lower speeds at the output. A discontinuity in a zone will cause the average output speed to fall as vehicles slow to pass the impediment, and this probably will still be felt at the next down lane sensing station. To this extent the discontinuity may be first shown in the zone in which it occurs although it will be shown in the next up lane zone as the backup builds up there.

Some tests were run under normal traffic conditions to determine the relative significance of the three parameters as a means of detection of critical conditions, and also to determine the stability of comparison of the parameters. Figure 12 shows traces secured during these tests. The first trace is the input volume at Location 3 and serves as a control for measurement at different volume levels. The projected

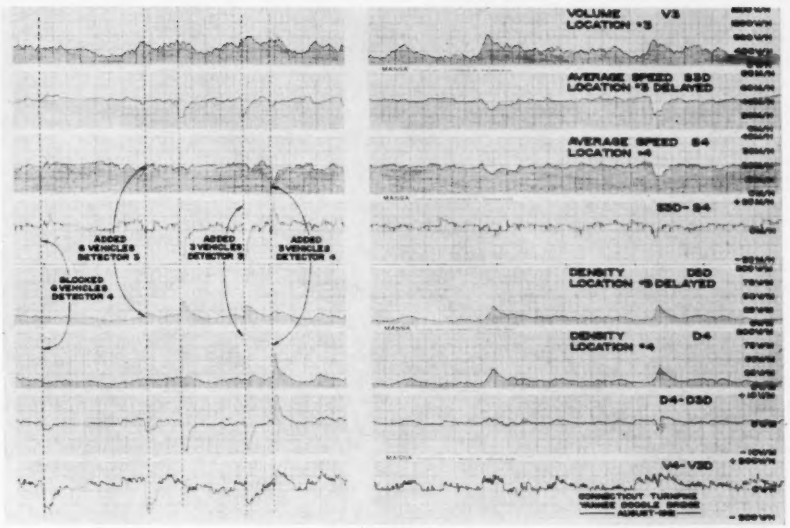



**Figure 12**
**Comparison of volume, speed, and density as operating parameter with normal and artificial discontinuities.**

input volume and the output volume traces are not shown. The volume difference, or comparison trace, is shown at the bottom of the figure.

The 2nd, 3rd and 4th traces from the top, show the performance of average speed as the operating parameter. The second trace is the projected input average speed, the third trace is the output average speed and the fourth trace is the difference between the projected input average speed and the output average speed. This is Mode 1 operation, which shows the breakdown in the test zone, rather than the breakdown in the preceding zone, as is shown with Mode 2 operation.

Density as a parameter is shown on traces 5, 6, and 7. The projected input density is shown on trace 5, the output density on trace 6, and the difference between the output density and the projected input density on trace 7. This is Mode 1 operation for the density parameter, which shows the breakdown in the test zone rather than the next downstream zone.

The speed difference trace, and the density difference trace in the Mode 1 operation, both follow the same general shape as the volume difference trace for a breakdown. The left-hand side of Figure 12 shows artificially created discontinuities produced by adding or blocking vehicles at the input and output. The results in the difference traces clearly show that any of the parameters might be used in the system. Field experience and refinements in settings are needed to provide conclusions as to the best parameter to use as an indicator of critical condition.

The right-hand side of Figure 12 shows the results of a test to determine if any or all of the parameters were capable of projection under severe rates of change in traffic flow, without marked error in the differences used for critical indication.

Arrangements were made to hold a small group of vehicles, approximately 20, on the exit ramp located about 2000 feet up lane from the zone under test. These vehicles were then released as a group and it will be noted that there are marked changes in both the volume trace graph 1, speed traces 2 and 3, and density traces 5 and 6, as this dense group of vehicles went through the zone. Significantly, the difference traces all remained stable, within normal variations, during this shock input. As might be expected, in trying to collect the 20 vehicles, the first car in line and the one held longest, was driven by the wife of the local Chief of Police. Fortunately, we had his permission to carry out the test, so he had the explaining to do.


## Acknowledgement

The author is indebted to Commissioner Howard S. Ives, State Highway Commissioner of the State of Connecticut for permission to use a section of the Connecticut Turnpike for these tests; and to Messrs. Robert G. Mitchell, Earl W. Osterhoudt, Robert Williston, and Burton Rudy for their help and cooperation on the technicalities involved.


*(Continued on page 50)*

# Planned Pedestrian Programs In New York City

By Charles J. Murphy
Director Traffic Safety Education
New York City Department of Traffic

WALKING NEW YORK CITY streets are over 3,500 men, women and children who are healthy, living proof that pedestrian casualty rates can be reduced through the planned combination of sound engineering, a forceful pedestrian safety education program, and enforcement of an effective anti-jaywalking law. Jaywalking casualties declined an average of 120 per month during the first 33 months following the coordination of these three factors in the safety program of the Department of Traffic.

Engineering improvements and safety education combined to lay the groundwork for public acceptance of the anti-jaywalking enforcement in July, 1958. With that date as a midpoint, a five and one-half year analysis of jaywalking casualties from January 1956 to March 1961 yields the encouraging results shown in Table I.

This substantial safety improvement reflects the gratifying measure of success attainable when the "3 E's" of traffic safety—Engineering, Education and Enforcement—are combined in a unified program.

### Safety Engineering Encompassed Entire City

Upon the formation of the Department of Traffic in 1950, traffic engineering programs were developed to reduce accidents throughout the city. In scope it encompassed the entire City of New York with its 30,000 intersections and 6,000 miles of streets, serving approximately 2 million vehicles and 8 million pedestrians.

However, in this huge complex, outmoded signal equipment, improper timing and controls, lack of any safe route to school plan for children, difficult to read directional and regulatory signs, the utilization of the dangerous "STOP ON RED SYSTEM" and numerous other antiquated principles guided traffic in the largest city in the country. In effect, the city was 20 years behind the times in traffic safety improvements.

During this initial engineering phase more than 32,000 investigations of neighborhood safety problems were made. Over 20,000 modern three-level traffic signal faces on mast-arms were installed at 2,000 intersections to insure greater safety by improving visibility. Over 12,000 "STOP" and "YIELD" signs and 7,500 school warning signs were erected. More than 40,000,000 feet of safety zones, crosswalks and pavement markings were established.

### Department Pioneered Safe Route to School

Early in the engineering phase, the Department pioneered the "Safe Route to School" plan which the Institute of Traffic Engineers adopted as a national standard at its annual meeting in 1955. Over a million school children in the city's 1,200 public, parochial and private elementary schools are now protected by this program under which department engineers study traffic conditions in the school vicinity; determine what controls, crosswalks and regulatory and warning signs are required; and draw up a safe route map for the use of school authorities in training pupils to follow the safest route to and from school. Over 60% of the crosswalks in the city are currently established near schools.

Traffic Department engineers also designed original "Walk—Don't Walk" pedestrian signals which now control pedestrian movement at more than 6000 busy intersections. Following their installation at one dangerous Times Square intersection, pedestrian accidents dropped 75%—from 12 the year before to three the year after.

Comprehensive surveys which developed area-wide solutions to traffic problems, effected new safety solutions. The Manhattan Traffic Plan, for instance, established an efficient network of one-way avenues which cut pedestrian accidents up to 30% on the avenues affected. Selective engineering studies disclosed solutions to numerous individual traffic situations.

### Traffic Safety Education Division Created

In New York City's first direct attack, through public communications, on pedestrian accidents, the Department of Traffic created its Division of Traffic Safety Education in 1957. Spurred by the fact that three out of four of the city's traffic fatalities were pedestrians, the new division conceived and developed the first city-wide pedes-

TABLE I

Jaywalking Casualties 33 Months Before and After July 1958

| | Before | After | Difference | Reduction |
|---|---|---|---|---|
| Killed | 920 | 760 | — 160 | 17% |
| Injured | 32,142 | 28,317 | —3,825 | 12% |
| Accidents | 32,100 | 28,230 | —3,870 | 12% |

The author has been with the New York City Department of Traffic for the past five years. Earlier he was assistant to the executive vice president of the New York Board of Trade.

trian safety education program in the history of New York. Media and financial support for this effort was initially recruited through the establishment by the Traffic Department of the Mayor's Committee for Pedestrian Safety.

This citizens' group, which received their official appointment from the Mayor, was composed of a cross section of leading business executives who were to aid in creating a climate of safety in the city.

With our clearly defined goal—the reduction of pedestrian jaywalking deaths and accidents—firmly established, the campaign was launched in November, 1957. This was to be accomplished through a coordinated program of advertising, publicity and promotion plus citizen participation to disseminate traffic safety information for both pedestrians and motorists. Principles established for the conduct of this first pedestrian education program continue to guide subsequent campaigns in New York and cities throughout the country as well as several foreign countries.

### Pedestrian Safety Becomes Salable Product

With the purpose, need and scope of the program determined, the next step was to insure the use of every practical means of publicizing and promoting pedestrian safety. This meant a program utilizing television, films, radio, press, newspaper and magazine advertising as well as car cards, outdoor billboards, and posters. The approach was to sell safety using the same methods used to sell "soap" or any other commercial product. The difference was only in that there was to be no payment for advertising time or space—this had to be donated on a public service basis.

Before this massive promotional effort could be instituted, some over-all theme or slogan had to be devised to focus public attention on the primary causes of pedestrian accidents. An extensive study of traffic statistics for the previous ten years, revealed the following actions as the major cause of most pedestrian traffic mishaps:

1. Crossing in the middle of the block.

2. Crossing against a red light.

These two careless habits alone accounted for 75% of all deaths and injuries occurring to pedestrians of every age group.

Wiley checks new "Walk-Don't Walk" signals.

### "Cross at the Green . . . Not In Between"

The slogan: "Cross at the Green—Not in between" was created specifically to highlight these major causes of pedestrian accidents.

Once the campaign commenced, this life-saving slogan was imbedded in the minds of every New Yorker, commuter and visitor by utilizing fully every productive public relations technique available.

Personalities such as Steve Allen, Arlene Francis, Jackie Robinson and a host of others made television and radio commercials; Safety Queens were crowned; parades and poster contests were held; safety day, week, month and years were proclaimed. Girl Scout troops appeared on street corners throughout the city and handed out leaflets; green crosses were stenciled at pedestrian crossings; every traffic signal stanchion was decorated with safety posters; radio and television echoed the chant "cross at the green . . . not in between." New York for the first time in its history had begun to wake up to safety.

The cooperation extended to us by media was phenomenal and set a record for participation in a public service campaign. Studies showed that during various phases of the campaign our safety message went into 95% of the homes on four out of five days.

Local women rally for pedestrian safety.

LOOK when you WALK
SAFETY!
"WATCH IT SIR -cross at the green"
cross at the green not in between
LOOK WALK
BOY! they almost got you
DON'T JAYWALK

**Carcards displayed in buses and subways—safety material circulated to millions. Note the "Safety Owl" — familiar to all New Yorkers. Similar illustrations were used for safety posters placed at busy intersections.**

### 1,000 Civic-Minded Groups Participated

In addition to the substantial public service information effort, the Traffic Department supported this activity by mustering the participation of 30,000 members of over 1,000 civic, service, fraternal and school groups. Millions of pieces of safety material and literature were made available for distribution throughout the city. Since the beginning, the department provided special safety posters, folders, buttons and other materials as a means of generating citizen participation in each campaign.

Included among the widely disseminated printed safety material were the following:

Safety pamphlets—1,700,000; Outdoor posters—560,000; Subway carcards—100,000; Jaywalking cards—750,000; Safety buttons—2,500,000; Match books—10,000,000; Promotion kits—1,700; Bumper Strips—150,000; Letter imprints—75,000,000; Warning notices—1,000,000; Safety stickers—60,000; Green crosswalks—1,000.

Safety promotion kits were distributed at several hundred rallies. These provided literature along with organization plans and programs to aid co-operating civic groups in conducting successful local safety drives. These rallies achieved such a high degree of civic interest in traffic safety that in the following months, the Department was swamped by unprecedented requests for safety information and material. As a result, the Safety Education Division distributed well over 5,500,000 separate pieces of material.

This type of "grassroots" support accounted mainly for the extensive unity and effectiveness of the initial and successive safety drives.

**Poster clown leads children at crossing.**

### Final Phase Enforcement Operates Smoothly

After nine months of this massive public education program the public was thoroughly aware of the dangers and hazards of careless pedestrian safety habits and the final phase of the campaign—that of *Enforcement*—went automatically and smoothly into operation.

This phase of the program began with the successful promulgation by Commissioner Wiley of the first anti-jaywalking ordinance in New York City in 40 years. Every previous attempt to do so since the year 1918 had failed. With this new regulation, jaywalking became illegal, the subject of a summons and a fine of $2.

Actual enforcement got underway after a six-week warning period during which over 500,000 warning notices were issued. These carried no fine but explained the various sections of the new laws. This effort was supported by another huge advertising campaign which spelled out the responsibilities of pedestrians under the new regulations. Slowly but surely, the so-called habitually careless jaywalker began to disappear from the streets of New York. Of course jaywalking is still practiced, but it is obvious from pedestrian casualty statistics as well as observation studies that pronounced improvements have been made in all categories of jaywalking practices.

Surveys following the enactment of the anti-jaywalking regulation revealed that voluntary pedestrian compliance with the new traffic rules was a record 94%. This unprecedented high rate of observance resulted primarily from the acceptance, understanding and appreciation of the need for effective regulations established in the public mind by the department's safety education activities.

Jaywalking enforcement has never been on an all-out basis in New York

Vanquished jaywalker tells his sad story.

City. In 3 years only 100,000 jaywalking tickets have been issued. This is comparable to the number issued by police in cities with less than 10% of our population. We have, however, attempted to exploit every enforcement effort with large scale publicity so that the educational value of a ticket would not be on a one-for-one relationship between the offender and the policeman. Rather, we have attempted to use these incidents to educate others through newspapers, photos and newsreel stories.

### Gratifying Success Results from First Drive

The success of the first campaign can be judged by the fact that there were fewer pedestrian accidents in New York City during 1958 than in any of the previous ten years.

This heartening reduction provides convincing proof that it is possible to successfully alert large masses of people to the dangers of traffic hazards and to their responsibility for cooperating in protecting their own lives.

Unique because there was very little previous accomplishment to go by, the campaign was the first effort by governmental, civic, and business groups to combine forces and do something concrete about pedestrian safety in the city.

Continuing education is essential in seeking to change personal habits and attitudes toward traffic safety. Only organized, knowledgeable and purposeful safety education can motivate increased observance of traffic regulations.

Each successive annual safety campaign has consisted of several intensive periodic safety drives, coupled with engineering improvements and gradually increasing enforcement of traffic regulations. This broad, continuing educational campaign continues to utilize all major media including the press, TV, radio, outdoor advertising, posters, car cards, street signs, bumper strips, buttons, stickers, etc.

### Mass Media Contributes $3.5 Million Support

One yardstick of measuring the effectiveness of support extended by the mass media is the dollar value of its public-service advertising. In the last four years during successive safety campaigns, advertising in these basic media would have cost over $3.5 million. This figure represents 5 million lines of newspaper space, 8,000 television announcements and 73,000 radio spots.

With traffic engineering, education and enforcement efforts now successfully accepted in New York City, the department is able to conduct its annual pedestrian safety programs with increasing effectiveness. During each year, three specific and separate drives are conducted to combat seasonal pedestrian and traffic accidents.

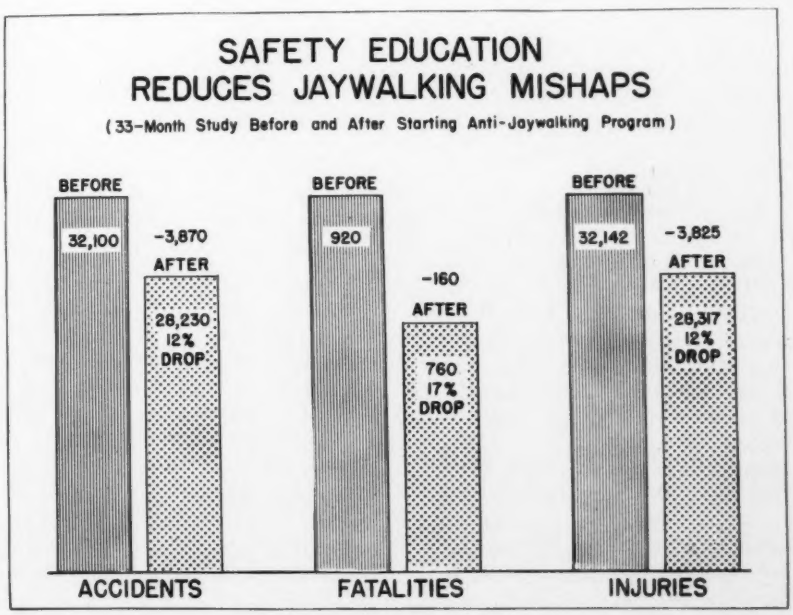
A special effort to emphasize voluntary pedestrian observance of anti-jaywalking regulations was conducted in February, 1959. This project was climaxed by a City Hall ceremony during which Mayor Robert F. Wagner awarded citations to several hundred persons and organizations who cooperated in making successive safety drives more successful.

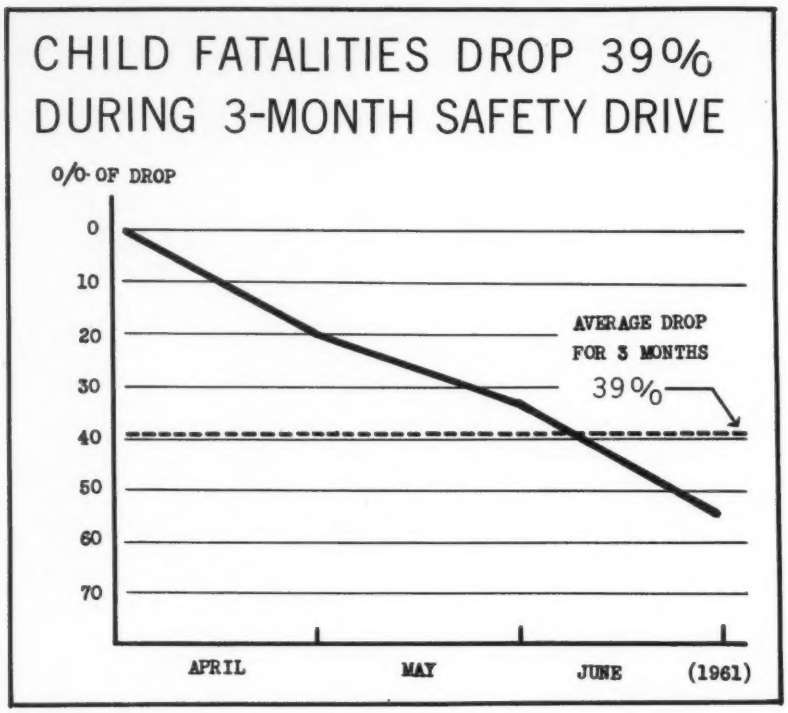
Early that spring, the department followed up by launching a massive school safety program which effected a dramatic 21.5% drop in child fatalities below the average of the previous five years during a three-month period.

Typical of safety ads viewed by New Yorkers.

The campaign was conducted during this 90-day period when, department studies revealed, there are more casualties than in the half-year period from October through March.

"Operation: School Safety" distributed safety kits containing over 1,100,000 pamphlets and lapel buttons, in addition to the 27,500 posters and car






cards posted in the city classrooms and on school fronts.

An interesting index of New York City's safety program's effectiveness was found in the rising number of inquiries from out-of-town and foreign communities. Requests for safety material samples were received from nearby Nassau County and as far away as Germany, England, Africa and Japan.

### 1959 Campaign Introduces New Theme

In 1959 "Pedestrian Safety Education Month" was proclaimed. "Look When You Walk" became the new theme along with "Cross at the Green . . . Not in between" used in the previous campaign.

During this campaign engineering improvements which included the installation of 550 additional "WALK —DON'T WALK" pedestrian signals highlighted this effort. "Safe Holiday Season" was proclaimed in November-December, 1959, to alert the public to the increased traffic hazards during the Christmas period, when pedestrian accidents here usually rise 50%. As part of this special campaign the Department tested an experimental "Talking" pedestrian signal at several of the city's busiest intersections, which attracted considerable publicity not only in New York City but nationwide.

The Department's Safety Owl had long been urging New Yorkers to "Be Wise, Cross at the Green . . . Not in Between." In order to maintain and stimulate additional interest in the program, a new symbol, "Tweets" the Safety Cat, joined forces with the owl during the 1960 campaign.

"I've got nine lives . . . Do you?" and "Hey, that light's gonna change!" represent several of Tweets' deliberately ungrammatical but effective contributions to the continuing safety program. College English professors took issue with one another over Tweets' grammar, ably abetted by departmental grammarians. The press joined the pro and con discussion thereby spotlighting public attention on the safety campaign. Hundreds of New Yorkers as well as people from other states wrote to the Department and newspapers, taking sides in the controversy.

Engineering progress continued. A program was initiated to give school crossings greater visibility by the adoption of the "ladder type" yellow plastic crosswalks. Conversions of 3,100 of the 9,800 school crosswalks was carried out during 1960.

Pedestrian accident surveys made in 1960 again pinpointed jaywalking as the principal cause of pedestrian accidents and indicated seasonal accident trends which were met by intensification of safety education activities during the danger periods.

### Intensified Drives Meet Seasonal Needs

Our studies revealed that during April, May and June there are more child pedestrian casualties in New York than during the first and final quarters of the year combined. This fact flew in the face of established and accepted "back to school" and summertime child safety campaigns. We thus had another attention getting subject as well as having actually defined our target. Accordingly, in 1960, the Department conducted a special massive safety program reaching one million school children in 1,100 public, private and parochial schools. Over 1,500,000 pamphlets and lapel buttons and 27,100 posters were distributed through the schools. These efforts were backed up by intensive informational activities through press and broadcast media.

Three times during 1960, "Tweets" the safety cat appeared on a total of 110,000 posters at intersections, in store windows and in other locations throughout the city. Six million daily riders read the "Tweets" car cards on thousands of trains and buses. Other millions saw the safety message on billboards throughout the city.

This year the department again hammered away at the child pedestrian accidents seasonal rise during the three-month danger period from April through June.

"Cross at Corners—Not Mid Block" is the current safety slogan displayed on 100,000 new posters throughout the city. One million buttons and 300,000 pamphlets with this new message and 900,000 bookmarks with safety instructions have been distributed to elementary school youngsters.

A television safety cartoon film prepared in both one-minute, and 20-second versions has not only been used by every TV station in the metropolitan area, but has been shown widely in motion picture theatres.

An innovation of this first safety campaign for 1961 is a specially written song entitled "In the Middle . . . In the Middle." The song, written by the well-known composer Vic Mizzy, is being played daily on local radio stations and has achieved a high degree of popularity.

Results show that there was an overall 39% decrease in child pedestrian fatalities during this 90-day period.

*(Continued on page 32)*

# The Future of the Roadbed for Personal Transportation

By Joseph Barnett
Deputy Assistant Commissioner for Engineering
Bureau of Public Roads, U. S. Department of Commerce

*This paper was originally prepared for presentation at the Fall Meeting of the National Petroleum Refiners Association at Atlantic City, New Jersey, on September 14, 1961.*

TO INTERPRET what one sees in a crystal ball is a privilege because such interpretation is long forgotten by the time it can be checked by experience. The future of personal transportation is tied to several forms but in my humble opinion the great bulk of the people-miles of travel in the foreseeable future will be by motor vehicle. The yearly people-miles of travel in the United States for the years shown are as follows:

1217.0 billion by motor vehicle, 1960[1]
22.1 billion by railroads (Class I), 1959, inter-city and commuter[2]
17.4 billion by rail mass transit, 1958[3]
29.1 billion by airplane, 1959[2]
2.3 billion by water, 1959[2]

It is my intent in this paper to discuss the probable future type of roadbed for these several forms of personal transportation.

The roadbed for nearly all travel by water is provided and maintained by God. There has been a steady decline in ferry travel as ferries are replaced by bridges, and steamer travel on rivers and lakes has almost disappeared as a form of personal transportation but survives as pleasure cruises. The individually owned motor boat has had an explosive increase in recent years and sailing continues its popularity. Boating is having growing pains similar to the early experiences of motoring; congestion, inadequate controls, insufficient storage space and an increasing accident experience.

The plight of the railroads and their attempts to rid themselves of profitless passenger traffic, other than commuter traffic, is well known and need not be belabored here. With suburban sprawl, commuter traffic is an important element of personal transportation in metropolitan areas and doubtless will be encouraged. It is possible that improvements in railroad roadbed, coupled with changes in passenger rolling stock, may change railroad passenger vehicle transportation. Some radical changes under study, such as the air car, can mean a complete rebuilding of the roadbed but this very need would tend to retard its adoption. It is more likely that commuter train operation will tend toward the equivalent of mass transit operation with advantage taken of light weight rolling stock, more seats and space for passengers per car, car-floor level platforms, multiple doors for quick entry and exit, and revisions of terminals for quick turnabout of trains.

There had been a steady decline in use of existing rail mass transit but the trend reversed and was slightly increasing a few years ago. The need for transportation in cities is so great that cities have to use every approach to relieve congestion—and mass rail transportation will have to be retained and improved. Doubtless subsidies in one form or another will be necessary. The subway system in New York City is on a self-supporting basis as far as operating costs are concerned, but the interest and amortization of the capital plant are subsidized.

There is need for considerable research and development in rail mass transit to improve the vehicle, the roadbed, and operation procedures to encourage use and reduce cost. There has been some improvement in rolling stock but the only attempt at change otherwise has been the introduction of the elevated monorail, as now in operation on a very short section in Seattle. The general antagonism to elevated structures and the cost, even though not as high as subways, are serious hurdles in the way of adoption of monorails.

A much more interesting possibility is in an installation abroad, where an open railroad for mass transit, generally on the ground or depressed, and on its own right of way, is located to serve land development in conformance with a city plan in which land use and mass transit rail lines are coordinated. A development in this country, somewhat but not quite comparable, is the use of a widened median of an urban arterial freeway for rail transit. It has been partially successful in Chicago in that much needed personal transportation is provided during the peak hours but its total, or twenty-four hour, use is still disappointing.

The most effective mass rail transit is a subway system, which is very costly. The only such system developed in recent years is that in Toronto; but it is to be voted on in San Francisco and is being studied in other cities, notably Los Angeles and Washington.

Air travel is forging ahead rapidly in providing long-haul passenger transportation. With intensive research in vehicles, controls and terminals, it will continue to advance in the years ahead. There is evidence, however, that air transport may have difficulty in increasing, and perhaps retaining, its traffic for short and moderate distances. As highways permitting free vehicle movement, particularly those on the National System of Interstate and Defense Highways between cities and in cities, are completed a traveler may find it easier to use his personal car or rent a car and free himself from air schedules and terminals not close to his destinations. When Interstate

1. Statistics of Bureau of Public Roads, Department of Commerce.
2. National Transportation Policy, Senate Committee on Interstate and Foreign Commerce print, 87th Congress, 1st Session.
3. Statistical Abstracts of the United States, 1960—House Document 331, 86th Congress, 2nd Session.

Highway 94 was completed between Detroit and Benton Harbor, Michigan, there appeared in the lobby of the General Motors Building in Detroit a display showing the comparable door-to-door travel times by air and by personal car for a trip between Detroit and Chicago. Early this year liaison was established between the Bureau of Public Roads, Department of Commerce, and the Civil Aeronautics Board insuring full exchange of information on highway and airline development and travel.

Now let's get down to motor vehicle transportation which has had such a phenomenal rise in the last half century that the very economy of the nation is closely tied to and dependent upon it. Except for the war years when there was artificial restraint of travel, the total number of motor vehicles and the total vehicle-miles of travel have excellent correlation in the United States with the gross national product. This makes it very easy for us to predict the future of motor vehicle travel. All we have to do is accept the predictions of economists for gross national product for a particular year and multiply by the factor revealed by this correlation. We also have the estimates for future traffic made by the states in connection with the Highway Cost Allocation Study made pursuant to Section 210 of the Highway Revenue Act of 1956, (70 Stat. 387), as amended by Section 2 of the Act approved August 28, 1958. These lead to the prediction that by 1975 the number of motor vehicles is expected to increase from the present 75 million to 110 million and vehicle-miles of travel from the present annual total of 720 billion to 1,170 billion.

What of the roadbed? Is it likely to change in mileage, size or character? To the casual observer it may appear that despite the almost seasonal change in motor vehicle characteristics there has been little change in most of our highways other than expressways. This is not true. There are about 3.5 million miles of rural and urban roads and streets in the United States and while this total mileage has not increased much in the last decade or two, the new roads have been important ones and there have been extensive improvements of existing routes.

Highway engineering is dynamic. While broad changes rarely are sudden, dramatic or radical, experience, research and investigations are evolving new concepts, changing outmoded thoughts and developing truer comprehensions of the needs of highway transportation and how to satisfy them. Also, the highway transportation industry itself is dynamic in that changes are continually taking place. The combination of continuously finding facts, changing demands and progress in construction techniques results in so many changes that the highway engineer who does not keep up with them and project them into the future soon finds his concepts of design and construction outmoded.

There are changes in motor vehicles, in the habits of drivers and in volume, type and purpose of travel. There are changes in materials and their use, in construction equipment and operation and in maintenance operations. There are changes in traffic control devices and their employment. These result in several significant changes in highway design and two are worthy of particular note.

The persistent trend in lowering the height of passenger motor vehicles and the steady increase in the percentage of the market captured by the compact and small cars have required a change in the criteria for measuring sight distance in the design of highways. The standards of several years ago are not very far out of line even today. The writers of those standards anticipated possible changes in height but assumed that improvements in brakes and ability to stop, and improvements in engines and ability to accelerate in passing, would offset any reduction in the height of eye of the driver. The actual reductions in height have strained this assumption and new standards for measuring sight distance are expected to be adopted in October in Denver by the Planning and Design Policies Committee of the American Association of State Highway Officials. The minimum stopping or non-passing and passing sight distances are to remain the same but the non-passing minimum sight distance is to be measured from a height of eye of 3′ 9″ to a height of object of 6 inches instead of the present standard of 4′ 6″ to 4 inches, and the passing minimum sight distance for two-lane roads is to be measured also from a height of eye of 3′ 9″ but to a height of object of 4′ 6″ instead of the present standard of 4′ 6″ to 4′ 6″.

These changes will have the effect of increasing the lengths of vertical curves over crests for non-passing sight distance by about 5 per cent, and for passing sight distance by about 10 per cent. Most designers already are using these or higher standards.

By far the most important change which has affected highway design has been the acceptance of the concept of planned control of access. It has taken a long time to have this concept accepted on a national basis. Those of us who have been advocating it for over a quarter of a century are gratified to see that all states now have this type of arterial highway. When experience of travelers on such highways spreads, all segments of the population will be happy about it. Particularly convincing are the fully access controlled highways of the National System of Interstate and Defense Highways and their forerunners, the toll roads, other freeways and the parkways, some of which date back several decades.

As of June 30, 1961, 10,825 miles of the authorized 41,000 miles of the Interstate System were open to traffic although some of this mileage will need additional improvement to bring it up to standard for 1975. Each month additional controlled access highways, chiefly Interstate highways, are opened to traffic. As of the same date, June 30, 1961, 4,378 miles of the Interstate System were under construction, and engineering and acquisition of right-of-way were in progress on an additional 10,052 miles.

The passage of the Highway Act of 1961 has insured the financing of the Interstate System and its simultaneous completion in all the states by 1972, in accordance with the clear intent of the Congress as expressed in the Highway Act of 1956.

Of equal importance is the steady trend to the adoption of control of access for arterial highways not on the Interstate System. I recently drove a 94-mile non-Interstate route out of New York City in two hours door to door, which in my younger days took seven to eight hours. Control of access, regardless of whether traveling around or through the several communities on the route, made the phenomenal saving in time possible, to say nothing of relaxed versus tense driving, safety versus great hazard, and the relief of congestion on the main streets of the urban communities on which the route was located formerly.

What of these roads in the forseeable future? Are they likely to accommodate the future type automobile? I see nothing in the laboratories of the automotive and petroleum industries that highway engineers cannot arrange to accommodate. Such developments as the gas turbine, light weight aluminum engines, low octane fuels, silicon converters for electrical propulsion and all hydraulic systems are not likely to change the character of the automobile sufficiently to worry highway engineers. The air car may prove troublesome in both highway construction and operation. I am confident, however, that the steady development of stable highway pavements and the ingenuity of traffic engineers in controlling every whim and capability of the great variety of drivers will meet the problem when, and if, the air car matures.

Of greater importance structurally is the pressure for higher permissible axle loads for trucks which, if not held in check, can require such huge expenditures for increasing load bearing capacity as to undermine the entire financial balance of motor vehicle transportation. The Illinois and previous test roads, in the cost of which the petroleum industry participated, are at least producing the information so necessary for intelligent decisions by administrators.

Traffic capacity or lack of it is one item which is very likely to affect adversely the expansion of the automotive industry. Persistent traffic congestion is a serious deterrent to personal automobile transportation. Increasing the number of automobiles and the vehicle-miles of travel does not seem to make sense without an appropriate increase in the highway plant which cannot be made without adequate funds for first cost and maintenance. The opposition of the petroleum industry, therefore, to well-thought out financial requirements in the form of gas tax and other forms of taxation is difficult to understand.

A sharp jump in total highway capacity where it is needed most will result from the development of the Interstate System. How long will these highways be adequate? Because the entire system is to have access control its capacity will never be diminished. Administrators will not be confronted with the problem so common in the past—of having highways lose their capacity and increase their accident potential by the interferences of roadside businesses. We, therefore, can make reasonably accurate predictions of how different sections of the system will hold up trafficwise.

The Interstate System is designed to accommodate traffic expected in 1975. A large percentage of the 41,000 miles, particularly those in rural areas, will be able to accommodate the higher traffic volumes expected many years later than 1975 and much of it will have sufficient capacity to accommodate traffic of the foreseeable future. This comes about because highways are designed for a number of traffic lanes. There is a very large difference between the capacity of a 2-lane, two-way road and a 4-lane, divided highway. We cannot build a 2½-lane highway. Thus 4-lane, divided highways are justified for volumes well below their capacity. In addition a section for which only a 2-lane, two-way highway is justified is to have its single roadway offset on a right-of-way of sufficient width to accommodate an ultimate 4-lane divided highway so that if volume should increase the conversion can be made with nominal cost.

Likewise, 6-lane and 8-lane highways are justified when the expected 1975 volumes are only a little greater than the capacities of 4-lane and 6-lane highways respectively. Thus there is to be considerable leeway on many miles of the Interstate System between expected 1975 volume and capacity.

There is still another factor which will greatly extend the period of time during which Interstate highways will accommodate the ever-increasing traffic volumes. This factor is the ability of a highway to carry volumes in excess of design capacity at somewhat lower speed and a little less freedom of movement than assumed for design capacities. For example, rural Interstate highways are designed for a capacity of 1,000 vehicles, passenger or equivalent, per hour, per lane, whereas they can handle 50 per cent more with a little less freedom and lower speed. Urban Interstate highways are designed for a capacity of 1,500 vehicles per lane, per hour, but 2,000 vehicles per lane, per hour, are being accommodated on existing urban freeways with proper ramp entrance and exit design and adequate distances between interchanges.

The reserve capacity of the Interstate System highways can be gauged by the number of miles for which the estimated 1975 traffic volume is well below possible capacity. Of the 40,424 miles for which 1975 traffic forecasts were made in 1961, over 36,000 miles are to have 2 or 4 lanes, about 3,200 miles are to have 6 lanes, about 1,000 miles are to have 8 lanes, and about 50 miles are to have more than 8 lanes. Of the 36,000 miles of Interstate highways with 2 or 4 lanes, over 30,000 miles are estimated to carry less than 20,000 vehicles per day in 1975, and an additional 4,000 miles less than 30,000 vehicles per day. Since operation on a 4-lane freeway is not too difficult with volumes of 40,000 to 50,000 vehicles per day, particularly with modern design and interchanges with sufficient distance between them, liberal reserve capacity is evident.

Where volume frequently exceeds the ability of a highway to accommodate it without serious congestion, it should be expected that additional parallel highways will be developed. There are many corridors of traffic demand where it is appropriate to have more than one controlled access highway, although only one may be included in the Interstate System.

The highways whose capacities are most likely to be taxed within a relatively few years are those in urban and suburban areas. The steady trend from rural to urban locations for employment and the explosive expansion of cities into the sprawl of suburbia are not subjects for this discussion except as they explain the increase in home-to-work travel in such greater proportion than the general increase in traffic.

The Interstate System has about 35,400 miles in rural areas and about 5,100 miles in urban areas. When the system is completed the urban routes are expected to carry about half the Interstate System traffic. Interstate highways in urban areas are naturally in corridors where the traffic demand requires more than one highway and it is natural that traffic will be attracted to the Interstate highway. So that even if there are sufficient parallel streets to carry the corridor traffic, the Interstate highway is likely to feel the brunt of the overload sooner than others. This is one of the reasons for advocating liberal distances between interchanges, for by so doing the short-haul local traffic, which generally can make just as good time on parallel streets, will be discouraged from using the Interstate highway.

Traffic congestion is our most press-

ing problem in personal transportation in many cities, and in all growing cities where travel now is tolerable it is bound to become a serious matter. Like all problems of great magnitude, it cannot be solved by a single approach. There is no magic panacea. Building freeways is not a complete solution, nor is rapid transit, which has excited the imagination of so many. Traffic congestion in cities will be solved only where there is an attack from several angles and all attempts at relief cooperate so that the efforts supplement instead of interfere with one another.

Freeways through and around urban areas will have the planned favorable effect on transportation, on the economy of the area and on congestion, but their full potential will not be realized without complementary improvements on all other arterials and distributors, for in the final analysis each trip has a destination which, of course, is never directly on a freeway. Strides are being made in our knowledge of the improvement of city streets, control of traffic and electronic guidance systems. Application of this knowledge will go a long way in relieving congestion.

Rail mass transit has been discussed. What has not been mentioned is mass transit by buses. It has always seemed to me that the potential of buses as a transportation medium for the moderate distances, for which mass transit is effective, has not been realized. The bus in cities today takes minutes instead of seconds to unload and load, is subject to all the vicissitudes of traffic on city streets, and is not very inviting. When moving, a full bus is a more efficient carrier of people and occupant of city streets than the automobile but it doesn't move a great part of the time. An automobile with only three or four occupants, not uncommon in riding pools, is more efficient, doesn't stop as often, and carries its occupants to their destinations without transfer. The attempts of city engineers to favor buses, as by offset bus bays and no parking approaching bus stops, have had little effect. The bus simply stops too often and too long to better its average over-all travel speed of 10 to 15 miles per hour.

The possibilities of improving mass bus transit are great. The bus of today is a poor vehicle for such transportation. If automotive engineers started from scratch without preconceived notions it would seem to me that they could evolve a bus that would take only seconds to unload and load, perhaps with doors throughout the length on both sides, with seats clear across like the old summer trolley cars. All passengers would leave on the left and enter on the right with fares paid before the bus arrives. This would require special stations consisting of two islands, or platforms, between which the bus would be stopped. This is not practical for buses stopping every block or two but it is feasible for the moderate haul of suburban-urban travel. The very limitation of spacing of such bus stations will effect increase in over-all travel speed, but when this is combined with unrestricted travel on expressways and freeways we have the makings of true express bus operation. Since such operation will cut the time of travel it will cost less, enabling the fare to be less than on other buses, further attracting riders and further reducing cost.

So-called express bus operation has been tried in several cities without much success. Its failure is understandable because the service is not express at all. The express bus as now operated is no different from any other bus. It stops at every traffic light and traffic jam just as any other bus and the only difference is that the driver skips several bus stops. The fare is usually higher, further discouraging patronage.

The test of true express bus mass transit has yet to be made. Some measure of it is the suburban bus operation in the Lincoln Tunnel across the Hudson River in New York City where express type operation is realized from the Port of New York Authority Bus Terminal to points well out in New Jersey. Over 700 buses per hour have been counted in one traffic lane with a few automobiles sprinkled between them, a truly phenomenal carrier of people.

Another approach in the relief of traffic congestion in the cities is the trend to try to reduce the need for travel, particularly during the hours of congestion. There are several proven efforts in city planning, looking toward a reduction in the over-all needed travel measured in vehicle miles and person miles, especially during the peak hours. City planning is a continuing effort to control the development of cities, looking toward the finest way of life possible within the realities. One of the realities is the recognition that all the traffic capacity believed to be necessary at a particular time in the future probably cannot be developed. It, therefore, is necessary to compromise with the ideal to reduce the needed person miles of travel and the ton miles haulage of goods.

In every large city, say in the million population class, there are people who must live in suburban and rural areas but there are others who favor apartment house living. These differing desires on the part of people ean be recognized toward the relief of congestion by encouraging the location of apartment houses near the centers of employment. That this is receiving serious consideration is evident in the trends in many cities. Much of urban redevelopment, in conformance with Title 1 of the Federal Housing Act, is aimed at this objective but there is also a trend in non-subsidized redevelopment to the same end. One reads almost daily of this type of development. In Chicago two 65-story apartment houses are being constructed not too far from The Loop. In New York City, without subsidy, the area very close to the Wall Street financial district is to be redeveloped into high cost housing, and not too far north of this area is the most massive series of redevelopment projects in the country, all for high rise apartments for middle and low income families. In Washington, D. C. the so-called Foggy Bottom area and the southwest redevelopment area will result in thousands of apartment house units almost within walking distance of the Government centers of employment. There is hardly a large city in the country in which this trend is not noticeable in one form or another. While the effect of this trend, percentagewise, on total travel may be small, nothing may be neglected in the broad attack on relief of urban traffic congestion.

In conclusion it may be stated that despite all the several directions of effort looking toward the relief of traffic congestion in cities; mass rail transit, mass bus transit, redevelopment which will decrease the need for home-to-work travel, and the decentralization of employment centers, (not discussed herein) the principal needs of personal transportation in cities, between cities and between suburbs and cities will still be overwhelmingly motor vehicle transportation.

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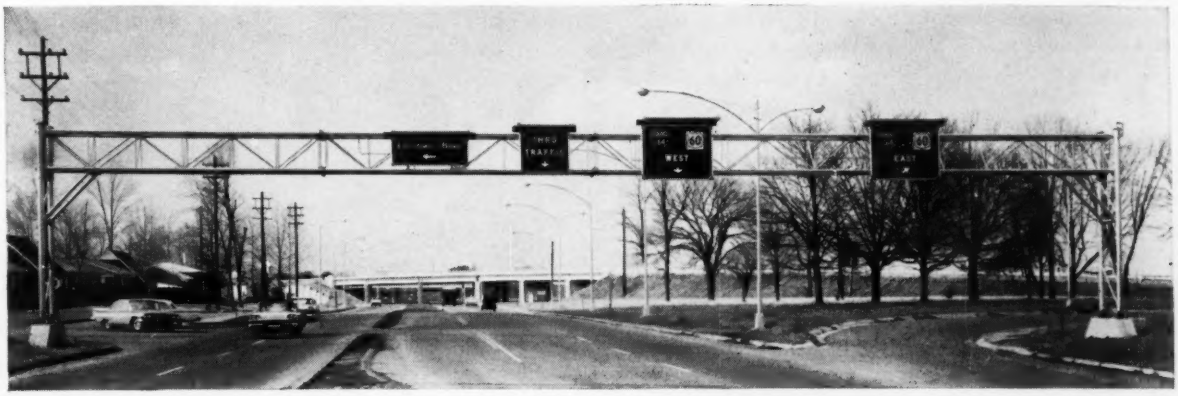


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01

# Traffic News

From left to right: Eugene Maier, Henry A. Barnes and William A. Bugge

## Maier, Barnes and Bugge Honored

Eugene Maier (Mem., ITE), Henry A. Barnes (Mem., ITE) and William A. Bugge (Affiliate, ITE) were among the ten public works "men of the year" honored by the American Public Works Association at the recent APWA meeting in Minneapolis. The announcement is part of a nationwide effort to honor these and other public works officials at the local, state and Federal levels.

Maier is director of public works in Houston, and was formerly city traffic engineer of that city. Barnes is commissioner of transit and traffic in Baltimore, and was formerly city traffic engineer in Denver. Bugge is director of highways in the State of Washington, and a former chairman of the Highway Research Board.

Others named this year were: David V. Auld, director of sanitary engineering, government of the District of Columbia; Hugh A. Benner, director of public works, Saginaw, Michigan; George De Ment, commissioner, department of public works, Chicago, Illinois; Robert H. Hess, director of water and sewage treatment, Wichita, Kansas; David B. Lee, director of sanitary engineering, Florida state board of health, Jacksonville, Florida; Jean L. Vincenz, director of public works, San Diego County, California, and Brig. Gen. Alvin C. Welling, commanding general, corps of engineers ballistic missile construction office, Los Angeles, California.

The announcement came during a special luncheon at the Hotel Leamington, Minneapolis, held to note officially the National Public Works Week observance, October 1-7. This is the second consecutive year that the American Public Works Association and Kiwanis International have co-sponsored the observance which is designed to increase the citizen's awareness of the importance of public works in the lives of the American people and to encourage young men to pursue careers in this field.

The selection of ten officials as the "outstanding" men in the public works field is part of this observance. The individuals selected must possess, in high degree, the professional excellence and record of valuable service to the community typical of public works officials throughout the U. S.

The persons named this year were selected at a Washington, D. C. meeting by a panel of judges composed of: J. O. Tally, Jr., immediate past president, Kiwanis International, Fayetteville, N. C.; Harmer Davis, director, institute of transportation and traffic engineering, University of California, Richmond, Cal.; William Foster, editor, American City magazine, N. Y., N. Y.; Mark Hollis, chief engineer, U. S. Public Health Service, Washington, D. C., and Ray Lawrence, consulting engineer, Kansas City, Mo.

The panel cited David Auld for distinction in the management of Washington D. C.'s water and sewage facilities, his work on the national planning commission and leadership in promoting water pollution abatement. Development of electronic control measures in the City of Baltimore and origination of the traffic free interval for pedestrian crossing were contributory factors in the selection of Henry Barnes. The judging panel chose William Bugge for his accomplishments in the field of highway construction and design in the State of Washington and service as chairman of the highway research board of the National Academy of Sciences. Hugh Benner's award was based on work which resulted in citations to the City of Saginaw, Mich., for excellence in street lighting, snow removal and water supply. George De Ment was cited for ingenuity in meeting the needs of Chicago's rapidly increasing population and application of new engineering techniques to answer the problems and meet the challenge inherent in large communities. Robert Hess' skill in operating the complex Wichita, Kansas water works and efforts on behalf of water pipeline research contributed to his selection. David Lee was cited for his wise counsel and advice to Florida officials on water and sewage problems. Eugene Maier was selected for his contributions to traffic control, nationally and in the City of Houston, Tex. Jean Vincenz, public works director for San Diego County, Cal., for his leadership in the broad field of public works and pioneering work on the sanitary landfill method of waste disposal. Gen. Welling's outstanding record of accomplishment and his contribution to the national defense as overseer of construction of 70 ICBM bases within the continental U. S. were cited in the announcement of his selection of this honor.

Each member of this year's "Top Ten" received a plaque commemorating his selection at ceremonies held during National Public Works Week.

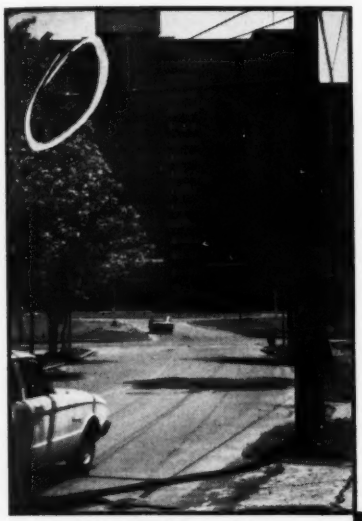
## Inter-American Traffic Seminar Held in Washington

The first Inter-American Traffic Seminar was held in Washington from September 4 to 8, under the auspices of the Pan American Union—Organization of American States. The meeting, held in the building of the Pan American Union, was attended by approximately 75 persons, representing 15 countries of the Americas. Included were representatives from Argentina, Bolivia, Brazil, Canada, Colombia, Chile, Dominican Republic, Ecuador, El Salvador, Nicaragua, Peru, United States of America, Uruguay and Venezuela. Puerto Rico was represented, as were a number of international organizations.

The week-long program featured half-days devoted to the topics of traffic safety, traffic engineering, responsibilities of traffic police, need for com-

# NEW DIRECTION/MOTION DETECTOR

## CHEKAR®ultra-sonic vehicle detector recognizes difference between approaching and receding vehicles



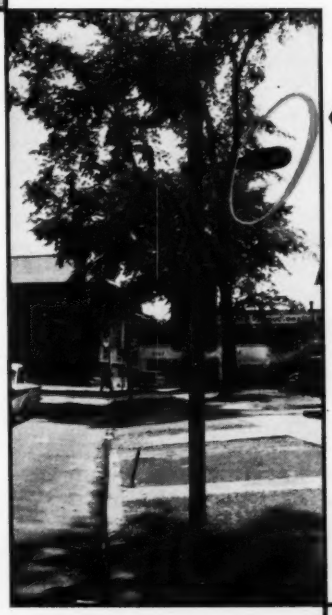
The new CHEKAR® direction/motion detector (Type SVDM) is used with vehicle-actuated signals. It uses ultra-sonic (inaudible) sound waves to detect moving vehicles *approaching* actuated signals—at speeds as low as 4 mph—yet offers high immunity to *receding* vehicles which may enter the detection zone. You get maximum protection against false signal calls by departing vehicles.

**LOW COST** The Type SVDM vehicle detector is priced to compete with any overhead detector available.

**SIMPLE INSTALLATION** All components are mounted above ground. No special tools or meters required for installation or adjustment.

**EASY MAINTENANCE** Electronic circuits use only four tubes, all low-cost radio-TV types, obtainable anywhere. FCC licenses not required.

Mast-arm mounting provides detection for one or two adjacent traffic lanes. Vehicles stopped or parked in one lane do not interfere with detection of moving vehicles in other lane.

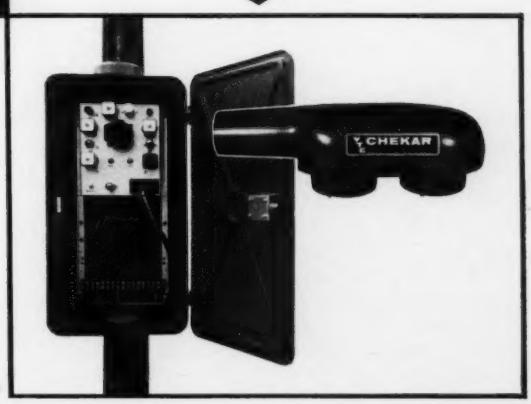


Side-fire mounting at roadside, usable in many locations, offers maximum installation economy. Provides detection up to two lanes out from curb—exact coverage depends on local conditions. (With side-fire detection, parking must be restricted near detector to avoid distorting ultra-sonic detection beam.)

**CHEKAR Detectors for All Your Needs**

Where motion detection does not meet your requirements — where you need vehicle detection down to a dead stop, or maximum resolution of closely-spaced vehicles—CHEKAR ultra-sonic *presence* detectors Types STD and SVDTare ideal. These performance-proven detectors, together with the new Type SVDM direction/motion detector, provide a selection that will meet practically any requirement. Ask for additional information.

Sensing unit has slip fitter for standard 2″ (2⅜″ O.D.) mast arm. Transceiver chassis mounts in weatherproof case, is plug-connected for easy installation and removal.

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## VEHICLE TRAFFIC CONTROL DIVISION

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prehensive traffic programs and relationship to urban and regional planning, improving traffic conditions through modern street and highway design, and international cooperation. Attention was also given to various recommendations arising from the several Pan American Highway Congresses held in recent years.

The U .S. delegation to the Seminar consisted of the following: Gerald W. Russell, U. S. Department of State; A. F. Malo, Detroit; Burton W. Marsh, Washington; J. O. Mattson, Washington; D. Grant Mickle, Washington; Charles W. Prisk, Washington; and Edward G. Wetzel, New York.

Other Institute members serving on official delegations included: Luis E. Alvarez, Chile; and Robert Burton, Canada. Many Institute members participated as speakers or observers.

Throughout the meeting emphasis was placed on the need for planning and professional traffic engineering effort. The need for international exchange of information was stressed, and various methods were proposed to make this exchange effective. Urged too was the provision at future Pan American Highway Congresses for special traffic meetings, either in conjunction with the Congress or separately.

## American Municipal Association Inaugurates New Planning Service

The American Municipal Association recently announced the inauguration of a new Urban Transportation Planning Service designed to help cities undertake transportation planning studies along the lines recommended by the National Committee on Urban Transportation (NCUT).

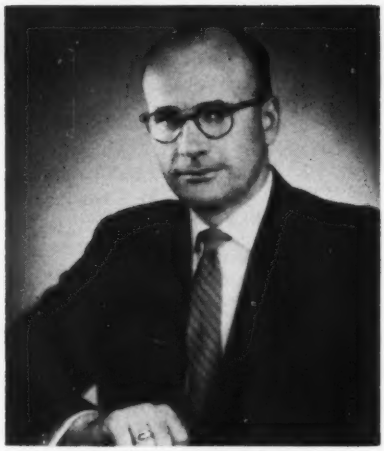
The AMA has named Mr. Richard C. Cowdery to head this important service. Mr. Cowdery formerly was with the Bureau of Public Roads' Highway Planning Division in Washington, D. C.

Mr. Cowdery has announced that the AMA planning service is prepared to:

1. Represent cities with the various agencies involved in a transportation study;

2. Show cities how to organize a continuous transportation planning program within their present administrative structure;

3. Adapt the NCUT manuals to the individual needs of cities;



*Richard C. Cowdery*

4. Provide technical advice on all phases of the program;

5. Help cities obtain financial assistance for the work to be done; and

6. Help cities obtain public support for the program.

The National Committee on Urban Transportation was formed in 1954 to develop a practical system of fact collection and transportation planning adaptable to communities of all sizes. Their work was completed in 1960 and has resulted in the publication of a number of guides and technical manuals for carrying out a planning program. The ITE has endorsed the NCUT program.

By following these guides and manuals cities can:

(a) Evaluate the soundness of existing traffic and transportation policies and practices;

(b) Create a truly functional relationship between transportation and city development;

(c) Determine current transportation deficiencies, probable future needs within the context of urban growth and foreseeable land use changes;

(d) Present legislative bodies and the public with fully documented reports on needs;

(e) Prepare realistic plans to improve all forms of transportation service; and

(f) Establish priorities and permit continuous programming on a factual basis.

The American Municipal Association has thus taken steps through this new service to see that cities are informed about NCUT's recommended program, and to establish a means through which cities can obtain assistance in undertaking such a program.

## Sixth International Study Week in Traffic Engineering

The OTA/PIARC/IRF Joint Committee (the permanent directing committee of the International Traffic Engineering Conference) is organizing, with the cooperation of the Austrian Automobile and Touring Club (Oe-AMTC) and the Austrian Road Safety Organisation, the Sixth International Study Week in Traffic Engineering, which will be held from September 10 to 14, 1962 in Salzburg, Austria. All who are interested are, as usual, cordially invited to enrol.

The program of the Study Week will include the following subjects:

Schemes of road networks in urban areas; Design of intersections in urban areas from the capacity point of view; Traffic analysis, forecast and assignment by means of electronic computers; Planning and use of parking garages; Mutual obligations of turning traffic and pedestrians at signal-controlled intersections and appropriate indication thereof; Single vehicle accidents in relation to road markings and furniture.

The Study Week will be followed by an International Road Safety Congress.

Further information may be obtained from the World Touring and Automobile Organisation, 32 Chesham Place, London S. W. 1.

## Davis Named Honorary Member of APWA

Harmer E. Davis (Affiliate, ITE) director of the Institute of Transportation and Traffic Engineering at the University of California, and chairman of the Highway Research Board, has been named an honorary member of the American Public Works Association.

Davis received the award for "his outstanding record of leadership and achievement in the field of street and highway engineering, management and research and for his contributions to education."

As an educator, Davis has been cited for his exacting demands for technical ability, combined with a sense of the broad social and political problems inherent in the transportation field. His membership in professional associations and service on state and Federal committees have made him a national figure in the field of transportation.

## New Engineering Center Occupied in New York City

Nineteen engineering societies have moved into the new United Engineering Center in New York City. This is a 20-story building on United Nations Plaza, between 47th and 48th Streets, built at a cost of $12,000,000.

The Center becomes the largest concentration of professional engineering societies in the world. The occupants include the five "Founder Societies"—the American Society of Civil Engineers, the American Institute of Mining, Metallurgical, and Petroleum Engineers, The American Society of Mechanical Engineers, the American Institute of Electrical Engineers, and the American Institute of Chemical Engineers.

Others are: United Engineering Trustees, Inc., American Institute of Consulting Engineers, American Institute of Industrial Engineers, American Society of Heating, Refrigerating, and Air-Conditioning Engineers, American Welding Society, Engineering Foundation, Engineering Index, Engineering Societies Library, Engineers Council for Professional Development, Engineers Joint Council, Illuminating Engineering Society, Society of Women Engineers, The Municipal Engineers of the City of New York, and Welding Research Council.

The mailing address for all these organizations is now 345 East 47th Street, New York 17, N. Y.

## ASF to Stress Highway Programming and Management

The Automotive Safety Foundation has announced that it will expand its highway research program to help states plan future highway construction.

J. O. Mattson, president, said the first project under the new program will be a study for the State of Washington to develop procedures for scheduling highway improvements on a priority basis with construction geared to revenues available under the state's existing tax structure.

The study will be made at the request of the Washington Legislative Joint Fact-Finding Committee on Highways, Streets and Bridges and the State Highway Commission.

Mr. Mattson said the year-long project will include a review of the state's highway administration and its system for classification of roads and streets into areas of state, county and city responsibility.

The Foundation has completed similar studies in Kentucky, Tennessee and Rhode Island.

These surveys and the highway needs studies made by the Foundation in 27 states and two Canadian provinces since 1946 have shown the necessity for more work on highway programming, management and classification problems, Mr. Mattson said.

"The time required for the needs studies," he said, "made it impossible to give more than minimum attention to these other important problems and to essential research.

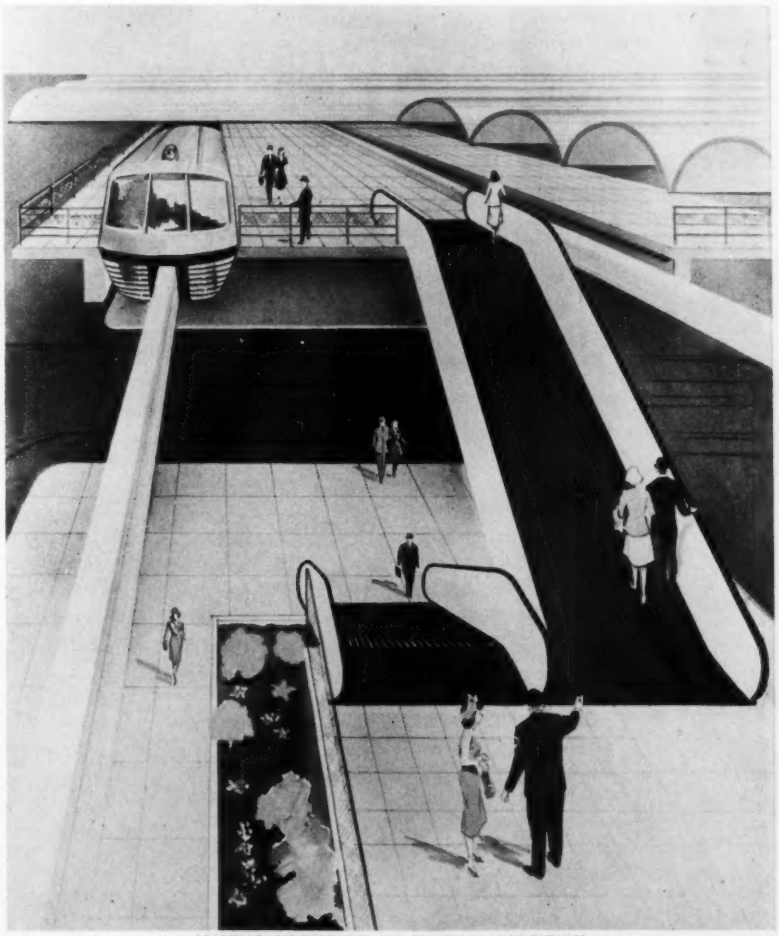
"The ASF Highways Division will now be able to devote full-time to helping the Nation's road agencies improve management and planning practices. These agencies expect to spend more than $125 billion in the next 10 years."

It is essential, Mr. Mattson added, that highways be constructed and maintained with a minimum of waste.

This can be done, he said, only if states schedule projects according to their greatest possible benefits and provide for the efficient management of facilities by the administrative agencies most logically responsible for them.

The new Highway Division program will include research to determine the relationship of highway design to accidents.

ASF engineers are now working with the U. S. Bureau of Public Roads in a joint project to collect information on accidents in which highway design could have been a contributing factor.



**MOVING SIDEWALKS AT SEATTLE EXPOSITION**

**Visitors to Seattle's "Century 21" exposition, which opens next April, will find the latest methods of transportation have been provided for their convenience. They'll have moving sidewalks to ease their way. Four moving ramps will carry exposition visitors from street level to the elevated monorail station at the downtown Seattle terminals as illustrated in this drawing. The monorail will transport passengers the 1.2 miles to the exposition site in 95 seconds. More than 10,000,000 persons are expected to visit "Century 21" with most of them traveling on the moving ramps and monorail system.**

***NEWS SPECIAL:*** **Word was received just as this issue was going to press that D. Grant Mickle, past president of the Institute of Traffic Engineers, has been named Deputy Federal Highway Administrator by Secretary of Commerce Luther Hodges. Full details will appear in the December issue.**

## German Exhibition of Transport Planned For 1965

The third German Exhibition of Transport and Communications, with international participation, has been announced for Munich in 1965. The dates selected are from June 25 to October 3.

The exhibition will include all forms of traffic and transport, including road, rail, water, air and space travel. It will also include sections on communications, power supply and tourist traffic. The show will occupy more than 700,000 square meters, or approximately 175 acres.

For further information on the exhibition, address inquiries to the management of the "Deutsche Verkehrs-Ausstellung Munchen 1965," Munchen 12, Theresienhohe 14, Federal Republic of Germany.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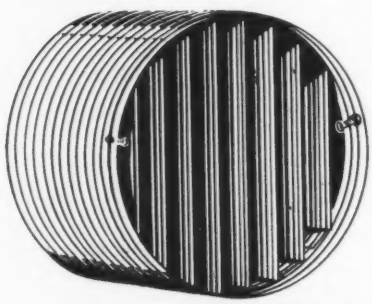

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## National Engineers Week Set for Feb. 18-24

"Economic Growth Through Professional Engineering" is the theme for the 1962 National Engineers' Week, February 18-24.

The annual observance will be the 12th under the general sponsorship of the National Society of Professional Engineers.

PEDESTRIAN SAFETY

*(Continued from page 22)*

Of possibly greater significance, however, is the fact that the first month, April, showed a 20% decrease which was accelerated to 33% for May and 55% for June.

To give the drive new impetus, Mickey Mantle volunteered his services and appeared on 50,000 corner posters during July and August.

### New Yorkers Now Think "Pedestrian Safety"

New Yorkers now have been stimulated to think about pedestrian safety and many of them are cooperating in numerous safety drives in their own neighborhood to assist the department in bringing about additional safety improvements.

Every safety effort since the inception of the annual programs has been based on these objectives: To alert the public to traffic dangers and make them aware of proper action; to further reduce pedestrian accidents, fatalities and injuries; and to provide assistance and cooperation to all other groups striving to improve pedestrian safety conditions in New York City.

Traffic safety education is a continuing task for all time and for all persons. The magnitude of the job increases each day because of the vast competition for the public's attention and each time something is done about it, new problems arise as more and more vehicles and pedestrians utilize our streets. For this reason, a pedestrian safety program must be more than an incidental education process, it must of necessity be a sustained and cooperative effort to implement a well thought-out plan with effective staff and leadership support.

## New Appointments

## Gilman Appointed Director

Roger H. Gilman (Mem., ITE) has been named Executive Director of the new Tri-State Transportation Committee by Governor Rockefeller of New York, Governor Meyner of New Jersey, and Governor Dempsey of Connecticut. Gilman, who has been Director of Port Development for the Port of New York Authority, will be loaned to the Committee for full-time service.

*Roger H. Gilman*

The Tri-State Committee was formed on August 31 by the three governors to study and make recommendations on improving commuter service and to attack also the problems of motor traffic, air travel and freight transportation in the New York metropolitan area.

Mr. Gilman attended Harvard College, graduating in 1936 with a degree in Engineering Sciences. During the next year, he attended the Harvard Bureau for Street Traffic Research for training in the principles of traffic engineering and administration. Following completion of the course in 1937, he joined the Port Authority as a statistician-economist.

After four years service with the U. S. Navy, he returned to the Port Authority in 1945 as Assistant to the Director of Port Development. He assumed his present responsibility as Director of Port Development in 1953.

As Director of Port Development, Mr. Gilman heads the department responsible for the planning of new transportation and terminal facilities (other than aviation) for the New York-New Jersey Port District.

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At the present time, he is Chairman of the Committee on Ship Channels and Harbors of the American Association of Port Authorities, a member of the Committee on Shipping and the Harbor of the New York Chamber of Commerce, and a member of the Rivers and Harbors Committee of the Newark Association of Commerce and Industry; also, a member of various committees of the Engineers Joint Council and National Academy of Sciences; and a director of the American Society of Civil Engineers, a member of the Society of American Military Engineers and the Harvard Engineering Society in addition to his membership in the Institute of Traffic Engineers. He is also on the Civil Engineering Advisory Committee to the Board of Trustees of the Newark College of Engineering.

## Barker Named Manager Of Automatic Signal

John L. Barker (Mem., ITE) has been named general manager and vice president of the Automatic Signal Division of Laboratory For Electronics, with offices at the plant in East Norwalk, Connecticut. He succeeds John Wilkins, Jr., now retiring after many years of service to the company.

Mr. Barker joined Automatic Signal as an applications engineer in 1933 following graduation from The John Hopkins University with a Bachelor's degree in Engineering. He has held a number of positions with the company, most recently that of director of research. During this period, Mr. Barker has been responsible for invention and development of many types of traffic actuated control and detection equipment, including the radar speed meter used throughout the United States and in many foreign countries.

*John L. Barker*

Recognition of this 28-year history of achievement was firmly expressed last month when the Institute of Traffic Engineers honored him with the Theodore M. Matson Memorial Award. It was the first time the Institute presented this award "for outstanding contribution to the profession" to anyone engaged in commercial research, development and manufacture of traffic control devices.

Holder of more than 35 patents, Mr. Barker has been active in various technical committees of the Institute of Traffic Engineers and is a member of the Highway Research Board of the National Academy of Sciences. He is also on the technical and steering committees of the just-formed Norwalk Technical Institute.

## Wynn and Myers to Head NY Office of Wilbur Smith

F. Houston Wynn (Mem., ITE) has been named to head the newly-opened office of Wilbur Smith and Associates in New York City. Named at the same time as principal assistant to Wynn was Dwight T. Myers (Mem., ITE).

Wynn, a longtime associate of the firm, has had extensive experience in transportation planning on an international level, and has been associated with the research and development of major transportation projects throughout this country.

Myers has had long experience in the traffic engineering field. He organized and developed the traffic engineering department in Providence, Rhode Island, and later served as deputy commissioner and chief engineer of the New York City Department of Traffic.

The New York office, at 30 Rockefeller Plaza, will give the Smith firm six operating bases in the United States. In addition to the home office in New Haven, offices are located in San Francisco, Columbia, S. C., Richmond, Va., and Winston-Salem, N. C. Overseas offices are located in London and Colombo, Ceylon.

## Schwar Appointed Professor at Ohio State University

Johannes F. Schwar (Assoc. Mem., ITE) has been appointed Associate Professor of Civil Engineering at Ohio State University. In his new post he will be teaching traffic and transportation engineering.

Schwar until October 1 was at Northwestern University, where he had been since 1958. In 1959 he received his M. S. and in August 1961 his Ph.D. at Northwestern.

He graduated from the University of Stellenbosch (South Africa) in 1949 with a B.Sc. in civil engineering. Following graduation, he joined the Division of Civil Engineering, Department of Transport, in Pretoria. He attended the Yale Bureau course in 1952 - 53, and then returned to his former position in South Africa, work-


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*Johannes F. Schwar*

ing mainly in the field of urban traffic and transportation studies.

In addition to his membership in the Institute of Traffic Engineers, Schwar is an Associate Member of the South African Institution of Civil Engineers and an Associate Member of Sigma Xi.

## Raus Joins Automatic Signal Sales Staff

Juri Raus (Junior Mem., ITE) has been appointed as Sales Engineer with Automatic Signal Division, Laboratory for Electronics Incorporated, Norwalk, Connecticut. Announcement was made by Mr. Paul L. Green (Member, ITE), Sales Manager.

*Juri Raus*

Mr. Raus was formerly Highway Senior Engineer with the Connecticut State Highway Department. He was graduated from the University of Connecticut in 1956 with a B. S. in Civil Engineering and subsequently joined the Traffic Division of the Connecticut State Highway Department. In 1957, he was awarded an Esso Standard Oil Company fellowship to the Yale Bureau of Highway Traffic, graduating in 1958, whereupon he returned to the Highway Department.

Mr. Raus was born in Estonia. He served with the U. S. Army during the Korean conflict.

## Barney Named Kerrigan Sales Manager

Tom Barney has been named sales manager of Kerrigan lighting products by Kerrigan Iron Works Company, Nashville, Tennessee, manufacturers of street, highway and area lighting standards, traffic signal, sign and floodlight structures.

*Tom Barney*

With Westinghouse Electric Supply Company in varying capacities for 22 years and for the past 3 years with Pfaff & Kendall as General Sales Manager, Mr. Barney comes to Kerrigan with a wealth of managerial experience in the electrical distribution field.

## Job Changes

Alvin A. Acton—formerly Acting Deputy Traffic Commissioner with the St. Louis Traffic Division in St. Louis, Missouri; is now City Traffic Engineer in West Palm Beach, Fla.

Charles F. Barnes, Jr.—formerly Project Engineer with the Planning Division of the Connecticut Highway Department in Wethersfield, Connecticut; is now Traffic Planning Engineer with the Automotive Safety Foundation in Washington, D. C.

Earnest W. Elliott—formerly Associate Highway Engineer with the Planning Division of the Connecticut State Highway Department in Wethersfield, Connecticut; is now Resident Study Engineer with the firm of Roy Jorgensen & Associates of Washington, D. C., on assignment in Pierre, South Dakota.

Philippe Ewart—formerly Traffic Engineer with the Quebec Roads Department in Montreal, Canada; is now a Consulting Engineer in the Town of Mount Royal, Quebec, Canada.

Kenneth G. Fields—formerly Assistant District Engineer of Traffic with the Indiana State Highway Department in Vincennes, Indiana; is now Assistant Regional Engineer, with the Construction Division of the American Oil Company.

Stephen George, Jr.—formerly Assistant Director—Traffic of the Twin Cities Area Transportation Study in St. Paul, Minnesota; is now Deputy Director of the Puget Sound Regional Transportation Study in Seattle, Washington.

Paul C. Hooper—formerly Assistant Highway Engineer in the Planning Division of the Washington State Highway Department; is now Traffic Operations Engineer in the King County Engineers Office in Seattle, Washington.

Herbert A. Keegan—formerly Traffic Engineer with the City of Paterson, New Jersey; is now Traffic Engineer with the City of Sioux City, Iowa.

Rocco A. Mancini—formerly Senior Traffic Engineer with Edwards & Kelcey in Boston, Massachusetts; is now Principal Transportation Planner with the Boston, Massachusetts, Redevelopment Authority.

Bill L. McCurdy—formerly Traffic Engineer with the Oklahoma Department of Highways in Oklahoma City; is now President of Traffic Consultants, Inc. in Oklahoma City, Oklahoma.

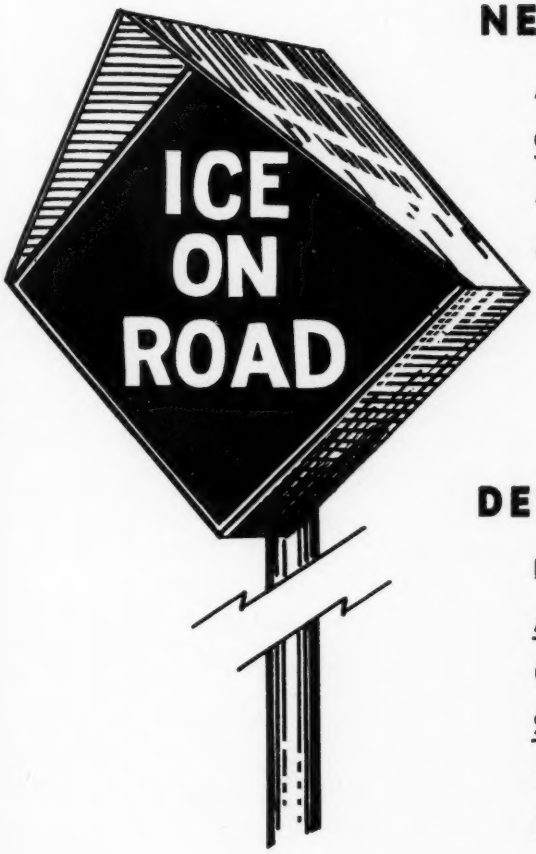
Walter S. Scott—formerly Traffic Engineer with the Community Planning Consultants in Vancouver, B.C., Canada; is now Research Planner with the Municipality of Burnaby, B.C., Canada.

Jean Villemur—formerly Engineer in charge of Design & Planning Section of the City Traffic Department in Montreal, Quebec; is now Section Engineer in the Projects Division of the City Planning Department in Montreal, Quebec, Canada.

## Title Changes

William Bidell—is now Construction Engineer with the Toronto District of the Ontario Department of Highways in Toronto, Ontario, Canada; was Program Engineer—Planning.

# NOW. . .

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Harlan H. Blindauer—is now Branch Office Manager of the Salt Lake City, Utah, office of Meissner Engineers, Inc.; was Project Engineer in the Reno, Nevada, Branch Office.

George A. Cochran — is now Urban Transport Engineer in the Traffic & Planning Section of the Louisiana Department of Highways in Baton Rouge, Louisiana; was Senior Traffic Analyst.

Arthur L. Dierstein—is now Assistant to the District Engineer, District III, of the Illinois Division of Highways in Ottawa, Illinois; was Traffic Engineer.

Gerard L. Drake—is now Director of the London Traffic Survey (Wilbur Smith & Associates) in London, England; was with the Columbia, South Carolina office of Wilbur Smith & Associates.

Alton Keith Gilbert—is now Transportation Planning Engineer with the City Engineering Department in San Diego, California; was Associate Traffic Engineer in the City Department of Transportation and Traffic Engineering.

Harold H. Horine—is now Engineer of Traffic Regulations with the State Highway Department of Indiana in Indianapolis; was Assistant District Engineer of Traffic with the Crawfordsville District, in Crawfordsville, Indiana.

David J. O'Connor—is now Engineer IV with the Wisconsin Highway Commission, in Madison, Wisconsin; was Engineer III.

J. E. Wright—is now Manager of the Urban Traffic Studies of the Planning & Survey Division of the Texas Highway Department in Austin, Texas; was Traffic Survey Manager.

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Salary: Open—depending on qualifications.

Apply: John W. McDonald, Director of Engineering, 2601 S. Figueroa Street, Los Angeles 54.

*(Continued on page 50)*

## New Publications

### Driver Personality and Behavior Characteristics

Bulletin 285. Highway Research Board, 2101 Constitution Avenue, Washington 25, D. C. April 1961. 34 pp. $1.00

This bulletin contains three papers presented at the 39th Annual Meeting of the Highway Research Board, as follows:

"Injury-Producing Private Motor Vehicle Accidents Among Airmen," by Joseph E. Barmack and Donald E. Payne, describes studies on the role of driver drinking in the type of accident under investigation and compares some biographical correlates of airmen who were drinking prior to lost time accidents.

"Personality Characteristics as a Selective Factor in Driver Education," by Robert V. Rainey, John J. Conger, and Charles R. Walsmith, reports the results of a personality study of 6,906 high school students tested prior to and some time after taking driver education training.

"Attitude Trends in Relation to High School Grade and Driving Experience," by Edward Levonian and Harry W. Case.

### Airport Transportation — A Study of Transportation Means Between Airports and the Metropolitan Areas They Serve.

P. G. Nordlie and others, Human Sciences Research, Inc., for Federal Aviation Agency. February 1961. 331 pp. (Order PB 171 856-7 from OTS, U. S. Department of Commerce, Washington 25, D. C., price $5.)

Ground transportation to and from the nation's airports must be revamped, preferably by creating mass transportation systems, if a time-conscious public is to be served and short-haul air carriers are to survive, according to a recent ground transportation survey sponsored by the Federal Aviation Agency.

Problems associated with airport ground transportation, however, are currently tied to a revolving paradox: airport-generated ground traffic represents less than one per cent of the overall traffic volume of the four cities surveyed in this report (Washington, D. C., New York, Chicago, and San Francisco) and metropolitan highway agencies, understandably, can hardly be expected to consider this volume

worthy of special attention, states the report.

On the average, air passengers spend from 22 to 65 per cent of their total trip time getting to and from airports, investigators found. Factors attributed to the time loss are widely dispersed points of departure or trip origin, and preference for auto transit, including private autos, limousines and taxicabs. Few cities have trains or helicopters serving airports, and bus lines carry only a small per cent of airline passengers, according to the report.

Other factors affecting ground travel time include ever-widening circles of suburbia which create two problems: passengers have farther to travel to reach the airport; encroaching suburbia impinges on airport acreage, forcing a further retreat from the centers of passenger origin and destination.

These and other considerations that affect to-and-from airport transportation lead survey investigators to conclude that ". . . there is reason to predict that ground travel, over-all, will tend to become slower rather than faster . . ." Nevertheless, the report predicts that air passenger volume will double by 1968; airports will be located farther from cities; ground travel congestion will increase in all forms.

### A Survey of Local Origins and Destinations of Users of Washington National Airport (Appendix B to Airport Transportation—A Study of Transportation Means Between Airports and the Metropolitan Areas They Serve.)

J. P. Robinson and P. G. Nordlie, Human Sciences Research, Inc., for Federal Aviation Agency. February 1961. 69 pages. (Order PB 171 856-7 from OTS, U. S. Department of Commerce, Washington 25, D. C., price of $5 includes both the basic report and appendix.)

Despite the fact that 86 per cent of airline passengers out-bound from Washington National Airport report that the average time (26 minutes) they spend getting to the airport is reasonable, acceptable—or even better than expected—a recent Federal Aviation Agency survey concludes that in Washington, D. C., as in other cities surveyed, a widely dispersed population and a lack of common points of departure for the airport contribute to significant slowdowns in intercity air transportation.

### Vehicle Traffic Law

By Edward C. Fisher, Traffic Institute, Northwestern University, Evanston, Illinois. August 1961. 468 pp. $10.00

The author, who is associate counsel of the Traffic Institute and a former municipal judge in Lincoln, Nebraska, has combined in one volume a complete treatise digesting and reviewing existing traffic laws and regulations.

The first five chapters cover the background, development, purpose of, and necessity for traffic laws. The remaining fifteen chapters contain a complete treatment of the legal and constitutional aspects of traffic engineering, legislative enactments, enforcement, licensing and revocation of licenses, jurisdiction, prosecution, penalization and punishment of traffic offenses.

### Traffic Short Courses and Conferences

Promotional and Procedural Guide, by Traffic Education and Training Committee, Traffic Conference, National Safety Council, 425 N. Michigan Ave., Chicago 11, Illinois. 43 pp. Single copies free, additional copies, $0.50.

This report, published for the Committee by the Automotive Safety Foundation, has been prepared to assist those responsible for the development and management of short courses, in-service training and conferences, whether in the field of engineering, enforcement or education. It treats such subjects as initial planning, course publicity, course preparation, course materials and other arrangements. It contains a valuable appendix with sample materials and forms which would be of help to anyone undertaking such a program for the first time, but which would also be of assistance to the experienced short course planner.

## Coming Events

**November 13-17—ADVANCED TRAFFIC ENGINEERING WORKSHOP—**
Traffic Institute, Northwestern University, Evanston, Ill. Tuition, $85.00. Contact: Director, NUTI, 1804 Hinman Avenue, Evanston, Ill.

**November 27-30—SOUTHEASTERN ASSOCIATION OF STATE HIGHWAY OFFICIALS—**
Annual Convention, Hotel Marion, Little Rock, Ark. Contact: Raif M. Smith, c/o Arkansas State Highway Dept., Little Rock, Ark.

**1962**

**January 8-12—HIGHWAY RESEARCH BOARD—**
Annual Meeting, Sheraton-Park Hotel, Washington, D. C. Contact: HRB, 2101 Constitution Ave., Washington 25, D. C.

**January 25-27 — CALIFORNIA STREET AND HIGHWAY CONFERENCE—**
Sponsored by the Institute of Transportation and Traffic Engineering, at the Los Angeles campus of the University of California. Contact: ITTE, University of California, Los Angeles 24, California.

**February 2-9, 1962—NORTHWEST ROADS AND STREETS CONFERENCE—**
(Formerly the NW Highway Engineering Conference) Oregon State University, Corvallis, Oregon. Contact: B. J. McClarty, Secretary, NW Roads & Streets Conference, c/o Bureau of Public Roads, 720 SW Washington St., Portland, Oregon.

**March 5-23—TRAFFIC ENGINEERING SEMINAR**
Sponsored jointly by Northwestern University and Midwest Section, ITE, at Evanston, Illinois. Tuition $225. Contact: N.U. Traffic Institute, 1804 Hinman Ave., Evanston, Illinois.

**April 17-19—WESTERN SAFETY CONGRESS & EXHIBITS—**
Ambassador Hotel, Los Angeles, California. Contact: Joseph M. Kaplan, Manager, Greater Los Angeles Chapter—National Safety Council, 3388 W. 8th St., Los Angeles 5, Calif.

**August 13-16—INSTITUTE OF TRAFFIC ENGINEERS—**
32nd Annual Meeting. Denver-Hilton Hotel, Denver, Colo. Contact: ITE, 2029 K St. NW, Washington 6, D.C.

**September 10 - 14 — SIXTH INTERNATIONAL STUDY WEEK IN TRAFFIC ENGINEERING—**
Salzburg, Austria. Contact: OTA, 32 Chesham Place, London S.W. 1, England.

**October 14-20—INTERNATIONAL ROAD FEDERATION—**
World Meeting, Madrid, Spain. Contact: IRF, 1023 Washington Bldg., Washington 5, D.C.

## Elmer M. Ward

Elmer M. Ward, 59, assistant director of the Highway Research Board for the past seven years, was taken suddenly ill at home on Sunday, August 27, and died on the way to the hospital.

Mr. Ward was graduated in 1927 from Iowa State College at Ames with a degree in civil engineering, and spent his early professional career with the Iowa Highway Commission.

From 1941 until he joined the Highway Research Board in 1946, Mr. Ward was with the U. S. Army Corps of Engineers, helping develop methods and equipment for rapid construction of roads in desert terrain.

He joined the technical staff of the Highway Research Board, National Academy of Sciences—National Research Council, as engineer of Maintenance in 1946, and later served also as engineer of Materials and Construction. He was appointed assistant director in 1954.

# New Equipment and Methods

**Publication of product announcements in this section should not be construed as endorsement or approval by the Institute of Traffic Engineers**

Interior of Cameo plant in 1912.

## Cameo Marks 50th Anniversary

This year marks the 50th anniversary of California Metal Enameling Company in Los Angeles, and 40 of these years have been devoted to the development, promotion and use of porcelain enamel on steel and aluminum for metropolitan street, traffic and highway signs.

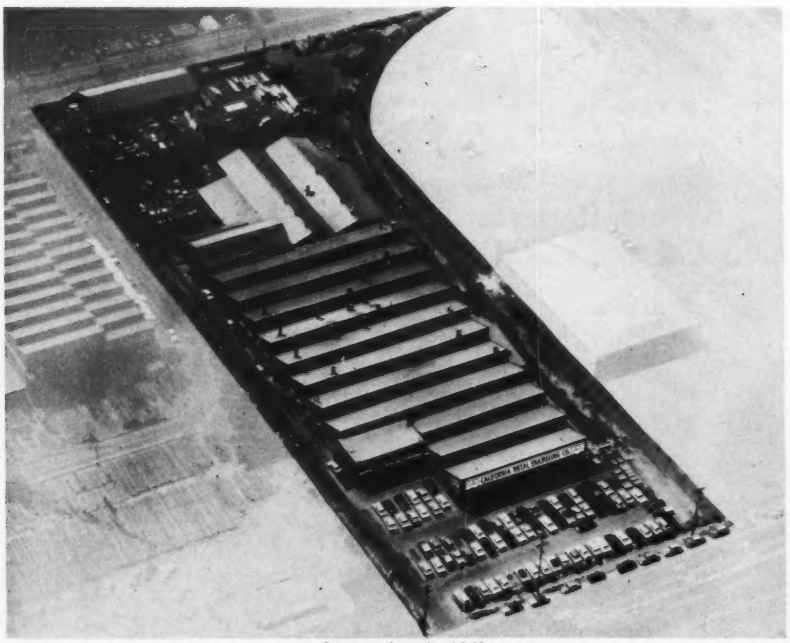
CAMEO was the first manufacturer of porcelain enameled signs for highway marking in the Western United States. Their first customer in this field was the Automobile Club of Southern California, and the following year the California State Automobile Association, who initiated road marking service in 1906 and 1907. These two clubs continued to buy and post CAMEO-manufactured signs at no cost to either the State of California or to the cities until 1929. That year Herbert Hoover, then Secretary of Commerce, published the nation's first manual of recommendations for standardized highway signs throughout the U. S. Because the recommended signs were larger, and represented a cost increase, the Auto Clubs began to charge for this cost differential but continued to maintain and post signs at no charge. In 1930 CAMEO began manufacturing reflectorized signs with glass reflector buttons for greater night visibility.

Los Angeles was the first California city to assume responsibility for manufacture and posting of its own street signs, but the Auto Clubs continued to post and maintain signs under contract to the State Highway Division until 1946.

CAMEO was the first West Coast plant to produce porcelain enameled aluminum signs and extrusions commercially. The research and development for this program was conducted by CAMEO ceramic engineers in their own plant laboratory.

In 1959 the need arose to develop a special furnace to fire porcelain enamel to aluminum sheets and extrusions in long unbroken lengths. A Fostoria furnace was redesigned using infra-red GE quartz lamps with tungsten elements, utilizing porcelain enameled reflectors, ceiling and side panels of bright gold for needed reflective efficiency. Exact temperatures of 1000°F are achieved in the firing tunnel of the furnace, which is 30 feet long and 6 feet wide.

CAMEO has recently installed new pickling tanks to handle 25 feet lengths of sheet aluminum and extrusions for highway signs and other products. Quality preparation of the aluminum



Cameo plant in 1961.

Hugh V. Penton, Cameo president

is a key factor in achieving the intimate and lasting bond of the porcelain finish that makes it a lifetime finish.

Signs of porcelain enameled extruded aluminum and porcelain enameled aluminum with honeycomb core are being used for the Federal Interstate highway program and account for a steadily rising percentage of production at CAMEO, according to H. V. Penton, president. Their light weight makes them easy to install without hoists or expensive erection equipment. CAMEO is now able to produce porcelain on aluminum signs in individual panels up to 5′ x 25′ with no seams or joints, which are capable of withstanding 100 mph wind loads.

## Photoelectric Control Unit

Electronic Control Products, Division of Electronic Fabrication Laboratories, Dunellen, N. J., has announced production of a new photoelectric control unit which automatically controls street lighting through daylight intensity. The device is preadjusted to turn street lamps on and off at specified light levels. A 60 second delay feature prevents accidental operation from spurious light rays.

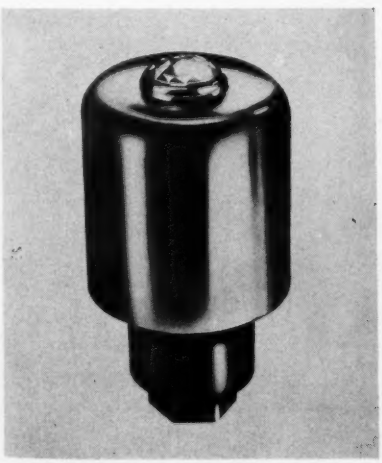
It can be installed without special orientation because it is sensitive only to directly overhead light. Possible effects from side light or reflections are thus eliminated.

The unit consists of a base and a hermetically sealed gas-filled electromechanical control head. It is completely impervious to climatic conditions. Built-in temperature control prevents icing.

Operating power is 115 or 220 VAC. Maximum power rating is 1500 watt lamp load. Temperature compensation ranges from —40° to +175° F.

Electronic Control Products spokesmen say that their new photoelectric control device is designed to perform with much greater reliability than other such devices on the market, enabling the manufacturer to guarantee the unit for two years.

**For complete technical information, write Electronic Control Products, P.O. Box 286, Dunellen, N. J.**



**Albert G. Giles, Director of Public Safety of Columbus, Ohio, tries out the push-button controls of the city's new Wald Statesman striping machine as John L. Gallagher, Columbus Traffic Engineer, and G. L. Bowman, Wald distributor, look on.**

## Wald Announces New Developments

Columbus, Ohio has joined the fast-growing number of cities to upgrade pavement marking operations with the addition of a highly advanced, Wald Statesman striping machine. The city normally applies 600 miles of center and lane lines to its streets, and is now also applying edgelines to some 55 miles of roads in its outlying sections.

The city's "new look" in pavement marking, recently demonstrated for city officials, and covered by newspaper and television stations, applies up to four lines simultaneously, in desired patterns of white and yellow, in broken or solid lines. For example, in the demonstration held recently, the machine applied a double yellow center line with white skip line in between the solid yellow lines, and also applied, simultaneously, a broken or "skip" lane line. Glass sphere dispensers reflectorize the freshly painted lines.

The Statesman unit, purchased from Wald Industries, Inc., of Huntingdon, Pa., is equipped with tanks that hold 60 gallons of white and yellow paint, and 750 pounds of glass spheres under pressure. High speed paint spray guns are controlled by push button.

The unit is also equipped with Wald's newly developed paint heater, which extends the painting season, speeds the painting operation throughout the day, and shortens drying time of the lines.

John L. Gallagher, Columbus Traffic Engineer, said the heater would make it possible to increase the normal painting season from a present five months to eight or more months, and that the striping machine's speed (15 miles an hour when striping as compared with about three miles an hour for former equipment) would greatly accelerate his entire program.

The Columbus Statesman is also equipped with Wald's new Optical Pointer to replace the wheeled pointer that normally extends in front of striping machines to guide operators. The Optical Pointer projects the image of a white cross on the pavement, and is a decided advantage in city marking operations, Gallagher said, since it eliminates the hazard of pointer extending into intersections.

Further upgrading the painting operation, the city has constructed a special "attendant service vehicle" — a compact, well-designed truck unit especially equipped to place and pick up painted line projectors, and transport additional supplies of paint, glass, etc.

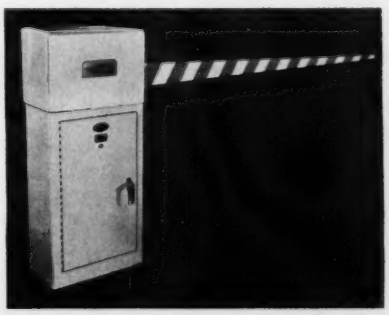
**Wald Industries, Inc., Huntingdon, Pennsylvania**

## New Automatic Parking System for Municipal Lots

Parcoa Division of Johnson Fare Box Co. has introduced an entirely redesigned gate-controlled parking system for municipal parking lots. The Parcoa "Low-Boy" system combines the advantages of low initial cost, economical "cheatproof" operation without attendants, minimum maintenance, and a wide choice of operating controls.

The "Low-Boy" unit is traffic yellow in color, with a low streamlined silhouette. A longer, lower gate arm prevents sport cars and foreign models from entering free by going around or under the gate.

A new "Toll-Road" control is now offered. This control opens the gate when a motorist throws the proper amount into the coin hopper on top. Another new feature is an automatic capacity counter, which lights a flash-



ing "Lot-Full" sign when a pre-set number of cars has entered.

The "Low-Boy" gates may be operated by coins (from 5¢ to $1.35), tokens, coded card-keys and ticket-dispensing controls. Any combination of controls is available, such as: coin and/or card-key entrance with free exit; free entrance with coin, token and/or card-key exit; free, ticket-dispensing entrance with token and coin-paid exit, etc.

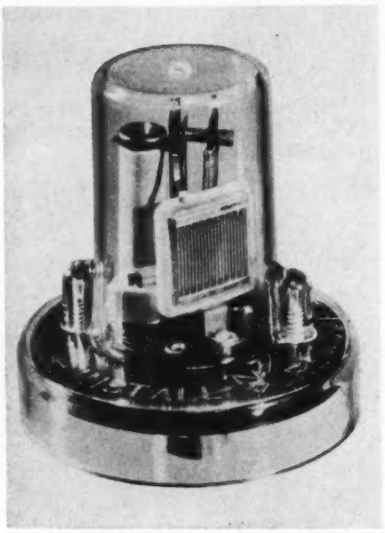
A new instant-reversing gate control speeds traffic flow during rush hours. This mechanism interrupts the closing cycle and reopens the gate, so cars need not wait until it closes completely before opening again. Easy maintenance is provided by a simplified gate mechanism, which may be removed for servicing by taking out only 3 bolts.

**For further information on the "Low-Boy" automatic parking system best suited to your specific needs, send for free folder. Parcoa Dept. TRN, Johnson Fare Box Co., 4619 North Ravenswood Avenue, Chicago 40, Illinois.**

## Photocontrol for Multiple Lighting

Multiple lighting gained a new expansion spur this month through introduction here of a photocontrol built to overcome four specific on-line performance problems reported by utilities. The new control, registered as the "Omega," is manufactured by Precision Multiple Controls, Inc.

According to Peter H. Zecher, vice-president of the local firm, more than a million tubeless photocontrols from



five major manufacturers are now in use for street lighting in every U. S. state. By giving municipalities automatic dusk-to-dawn lighting, at a cost for controls approximately 80% below the 1957 level, these small-size devices that team light-sensitive cadmium sulfide "sensing cells" with thermal and magnetic integrating relays "have made multiple lighting's advantages economically practical for every community, small and large," in Mr. Zecher's opinion.

The new "Omega," priced competitively with lighting controls now in use, incorporates safety features aimed specifically at the "natural adversities" most frequently reported by utilities: low- and high-voltage lightning surge, precipitation decay in photocells, atmospheric corrosion of integrating relay switches, vandalism and breakage due to field storage and handling.

The "Omega" incorporates the largest lightning arrester ever used in commercially-available photocontrols for outdoor lighting. The CdS photocell is hermetically-sealed in glass and mounted on a brass heat sink to prevent loss of "seal" through field vibration and shock. The transparent enclosure has been doubled in wall strength to heighten its resistance to amateur marksmen and vandals, and to reduce the chance of breakage in field storage and installation.

"Omega" controls are available in 115- and 240-volt models, with a 2¾" ID base to fit EEI-NEMA standard locking type receptacles. Rated at 1800-watts for incandescent lamps and 1800-volt amperes on mercury vapor installations, it has been primarily developed for electric utility and municipal street lighting, according to the manufacturer.

**Write for free Technical Bulletin, No. 770, to Precision Multiple Controls, Inc., Ridgewood, N. J.**

## New Mark-Time Parking Meter

Introduction of a compact, new parking meter with two-way visibility is announced by M. H. Rhodes, Inc., Hartford 6, Connecticut.

Called the "Mark-Time Sentinel," the new meter greatly increases the distances over which existent meters can be easily read. The clean, white "time-remaining" against the bold, red "time-expired" is viewed through a sealed, unbreakable window that provides the largest area of visibility in the industry.

Manually operated, the Sentinel is designed to require an absolute minimum of maintenance. Damage caused

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Use SAFE-T-CONES wherever traffic is difficult. Proven and accepted by Federal, State and Municipal traffic authorities in hundreds of major cities.
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by malicious vandalism or by the insertion of bent coins or foreign objects into the meter can be repaired on the street in less than a minute.

The Sentinel's sealed timing mechanism is dust-proof and weather-proof. If it ever becomes inoperable—even in a case of major damage—it can be quickly removed and returned to the Mark-Time factory, while another unit is slipped in, in seconds; there's no lost time, no lost revenue.

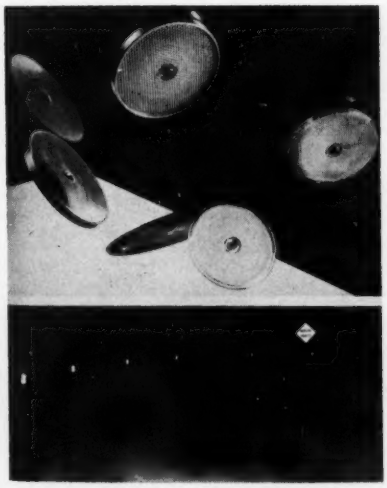
The coinbox is also sealed and cannot be opened without detection. It is protected by double-thick stainless steel doors and a new heavily reinforced #3 Zamac housing.

**Illustrated literature and complete details about the Sentinel are now available from Mr. C. B. Hayes at M. H. Rhodes, Inc., Hartford, Conn.**

## 3M Announces Plastic, Wide-Angle Delineator

A roadway delineator which combines for the first time the advantages of wide-angle reflection and prismatic plastic has been announced by Minnesota Mining and Manufacturing Co. (3M), St. Paul, Minn.

Visible at wide angles in headlights at night, these delineators continue to work as safety devices even when posts are bent out of position by accident or vandalism, according to 3M. In addition, wide-angle characteristics simplify the work of maintenance crews in aligning them along curves and other hazardous areas.



Called "Reflecto-Lite" brand delineators, these 3-inch center-mount reflectors are available in silver, amber or red, with or without an aluminum housing. Both types are completely dustproof and waterproof, the company said. They can be fastened to a post with any non-rusting fastener up to 3/16-inch diameter.

Delineator consists of a prismatic molded plastic face and back which seal in a wide-angle reflective sheet composed of glass elements embedded in synthetic sheet resin.

**Minnesota Mining and Manufacturing Co., 900 Bush Avenue, St. Paul 6, Minnesota.**

## New Snow-Melting Machine

A mobile snow-melting machine designed to cut the cost of snow-hauling by as much as two-thirds over present charges has been developed for the city of New York.

Last winter's snow-trucking cost New York City $1.46 per cubic yard, and totaled about $7,000,000. Depending on existing conditions, designers of the new melter estimate that it will remove snow at approximately 50¢-75¢ per cubic yard. It will also save the time it takes for trucks to shuttle between loading points and dump-sites.

In effect, the new machine is a huge mobile hot bath with a built-in furnace mounted on a truck. Snow is loaded into it at the rate of 1¼ tons, or 10 cubic yards per minute, and when the "stopper" is pulled, the water runs through trailing hoses into sewers or, in mild temperatures, can be discharged into gutters.

The hot-water furnace is fueled by kerosene and generates heat up to 3,000° Fahrenheit. This high heat is converted into 160° water temperature by circulation through a hot gas heat-recovery system. Hot water is injected into a melting tank where, after snow melts, water temperature progressively is reduced to 60° bath temperature and 40° discharge temperature. Exhaust gases from the furnace and from a diesel generator will be cleaned and filtered to eliminate air-pollution.

Based on successful earlier tests, engineers expect the new melter to remove snow about twice as fast as existing methods, which require initial piling and loading, and time-consuming hauling to waterfront or other dumping sites. This on-the-scene snow-removal will also obviate a constant problem of finding suitable dumping sites which are becoming increasingly scarce due to various types of waterfront construction.

The melter will require a five-man crew, not counting two men operating the snow-loader. This compares to a nine-man total employed under existing methods when snow is removed via a gang-system.

**The machine was developed by Peabody Engineering Corporation, 232 Madison Avenue, New York 16, N. Y.**

## M-B Truck-Mounted Highway Line Striper

Delivery of a new truck-mounted M-B highway line striper has been made to the Kansas City, Mo., Traffic Department by the M-B Corporation of New Holstein, Wis.

THE NEW TELESCOPING
WARNING-SCOPE
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Hawkins
THE NAME IN HIGHWAY SAFETY

Illustration height 11 feet. Leg spread diameter 61 inches. Basic assembly only weighs 15 pounds. Knurled locking nuts adjust height as desired. Nylon Vinyl Fluorescent Flags. Nylon Vinyl Roll-up sign or clamps to hold metal signs.

High tensile aluminum staffs and sturdy steel tripod base compactly folds to 6 by 43 inches.

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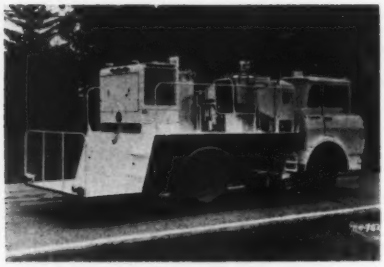

The huge new line striper is equipped with four paint guns and can lay both center lines and edge stripes at the same time. Center-line stripes may vary in distance from 8½ to 12½ ft. from the edge of the roadway. There are two side spray-gun carriages which extend on outriggers . . . one on each side of the truck. The carriages are provided with pneumatic tires and are air controlled to lift off the ground as high as 6 in., allowing short distance non-striping moves with the outriggers extended. Each carriage may be steered manually or locked into position for independent or tandem operation.

The carriage on the left side of the truck has three paint guns and three bead dispensers, while the one on the right has one gun and one dispenser. Lines from 4 in. to 6 in. wide are laid by the spray guns, and paint is carried in two 60-gal. tanks having air motor-driven paint agitators. The paint tank compressor is a liquid-cooled rotary type, with 85 CFM delivery at 100 p.s.i. Two bead tanks, a 420-lb. tank for the left-hand guns and a 300-lb. tank for the right, supply 6 lbs. of glass beads for each gallon of paint sprayed.

A skip-line mechanism provides 15 ft. of painted line and a 30-ft. skip section. Included is a "return to zero" feature which automatically returns the skip mechanism to the beginning of the painted-line section of the cycle. This device allows the operator to precisely copy or retrace worn paint lines.

Other features of the Kansas City striper include a large rear platform for dispersing and retrieving line guards, and an electronically powered communication system between the truck driver and the striping operators.

**More information covering this truck-mounted M-B highway line striper is available from the M-B Corporation, New Holstein, Wis.**

## New Color for Safety Paint

Lawter Chemicals, Inc., has developed a new color, "Traffic Yellow," for its line of HI-VIZ Industrial Safety Paint. Jack Heath, manager of fluorescent sales for the company, said "Traffic Yellow" will be the ninth color in Lawter's line of high visibility fluorescent safety paints.

"Traffic Yellow," according to Heath, is the fluorescent counterpart of non-fluorescent "Federal Yellow." The color has wide application for many municipal and industrial uses.

HI-VIZ Industrial Safety Paints also are available in Red-Orange, Yellow-Orange, Red, Pink, Cerise-Red, Gold-Yellow, Lemon-Yellow and Green.

The high visibility of Lawter's HI-VIZ line recommends the brilliant paints to many municipal uses such as application on fire hydrants, litter baskets, alarm boxes, police, fire and other emergency vehicles, traffic control signs and devices, highway stripings, barricades, signal paddles and flags, radiation protection shelters, tollway and expressway markers, etc. New HI-VIZ industrial safety paints combine greater brilliance and lasting weatherability, maintain their color for periods up to 21 months or more, depending on method of application and geographical location. The paints may be applied by brush, roller or spray equipment and also are available to aerosol containers.

**A detailed, illustrated brochure showing actual HI-VIZ applications, design hints and application instructions is available from Lawter Chemicals, Inc., 3550 Touhy Ave., Chicago 45, Illinois. A special technical bulletin and color card also are available for the new "Traffic Yellow" color.**


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- open frame construction for efficient heat dissipation
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- not affected by extreme temperature variations
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- hardened, polished pivots
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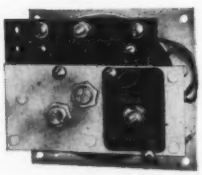
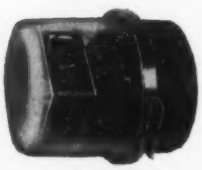
**Model 46**
1 or 2 circuit, front-mounted cams and contacts out in the open for fast, easy adjustment, replacement. Compact size 4⅜" high, 4" wide, 2¼" deep



**Model 3**
1 or 2 circuits



**Model 37 Jack-mounted**
Available with or without meter base and cover, as shown, 1 or 2 circuits

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**Applications**

Safety Zones
Caution Signals
Traffic Islands
Loading Zones
Warning Beacons
Flashing Stop Signs


## Membership Applications

**The Institute of Traffic Engineers welcomes applications from qualified traffic engineers, but does not desire as members persons who are unqualified. Listed below are the names of those from whom application for membership or transfer in grade have been received since the last published list. Institute members are urged to review this as soon as possible and immediately inform the Executive Secretary's office if names of people are found who are known to be unqualified for ITE membership or transfer.**

**NEW APPLICATIONS**

**BLOUNT, Emily Brown (Mrs. S. M., Jr.)**
Associate Traffic Engineer, Traffic Engineering Department, North Carolina State Highway Commission, Raleigh, North Carolina—for ASSOCIATE.

**BOWLER, Richard Kyle**
Highway Engineer, Automobile Club of Southern California, Los Angeles, California—for ASSOCIATE.

**CHANG, Chien**
Regional Intersection Design Engineer, Department of Highways, London, Ontario, Canada—for ASSOCIATE.

**CHEATHAM, Earl Francis**
Traffic Engineer, City of Garden Grove, California—for ASSOCIATE.

**EARNEST, Robert Roy**
Traffic Engineer, Spokane County Highway Department, Spokane, Washington—for JUNIOR.

**FERNANDEZ, Roger C.**
Civil Engineer I, Metropolitan Dade County, Miami, Florida—for JUNIOR.

**FISHER, Ewen Stuart**
Assistant Traffic Engineer, C. C. Parker & Associates, Hamilton, Ontario, Canada—for JUNIOR.

**FREEMAN-MARSH, John**
Planning Design Engineer, Nova Scotia Department of Highways, Halifax, Nova Scotia, Canada—for JUNIOR.

**GRAY, John Richard**
Associate Electrical Engineer, City Public Lighting Commission, Detroit, Michigan—for ASSOCIATE.

*(Continued on page 46)*

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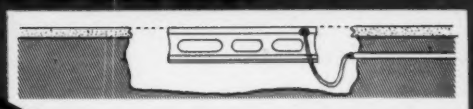

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Traffic & Location Engineer, Country Board, Victoria, Australia—for ASSOCIATE.

**HERNANDEZ, Rafael**
Highway Designer & Construction Co. Manager, Madrid, Spain—for ASSOCIATE.

**LaVIGNE, Herbert Hudson**
Project Engineer, Tudor Engineering Co., San Francisco, California—for MEMBER.

**LAZARA, Henry Lowell**
Highway Electrical Engineer, Washington State Department of Highways, Olympia, Washington—for ASSOCIATE.

**LIEM, Hugo O., Jr.**
Traffic Engineer, D. C. Department of Highways & Traffic, Bureau of Traffic Engineering & Operations, Washington, D. C.—for JUNIOR.

**MARCELLIS, Jack Charles**
Traffic Plans Engineer, City of Nashville Traffic Commission, Nashville, Tennessee—for JUNIOR.

**MELLEN, Curtis G.**
Highway Associate Engineer, Connecticut State Highway Department, Wethersfield, Connecticut—for ASSOCIATE.

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Transportation Research Engineer, Cerand Corporation, Boston, Massachusetts — for JUNIOR.

**MERCHANT, David Arthur**
Highway Engineer, U. S. Department of Commerce, Bureau of Public Roads, Washington, D. C.—for ASSOCIATE.

**MONTI, Thomas A.**
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**OTERO, Miguel Angel Barrera**
Civil Engineer IV, Department of Public Works of Puerto Rico, Bureau of Traffic, Santurce, Puerto Rico—for JUNIOR.

**QUIRK, Benedict John**
Chief Highway Engineer, Universal Engineering Corporation, Boston, Massachusetts —for ASSOCIATE.

**REMISZEWSKI, Stanley Simon**
Parking Director, New Haven Parking Authority, New Haven, Connecticut—for JUNIOR.

**ROBERTS, Kenneth Rayner**
Transportation Engineer, Wilbur Smith & Associates, Columbia, South Carolina—for JUNIOR.

**SCHNERR, Billy Marvin**
Traffic Designer, Texas Highway Department, Austin, Texas—for ASSOCIATE.

**SKINNER, Harry Britten**
Traffic Engineer, Memphis, Tennessee—for ASSOCIATE.

**TRUITT, Robert Eugene**
Assistant Traffic Control Engineer, Kansas State Highway Commission, Topeka, Kansas —for JUNIOR.

**WHITAKER, James Roberts**
Chief Engineer, Traffic Engineering Section, Her Majesty's Overseas Civil Service, Department of Public Works, Hong Kong—for ASSOCIATE.

**WOOD, Henry Ellis, Jr.**
Traffic Planner II, Metropolitan Dade County, Department of Traffic & Transportation, Miami, Florida—for JUNIOR.

**YOUNG, Lloyd Chapman**
Associate Transportation Engineer, California Public Utilities Commission, Los Angeles, California—for ASSOCIATE.

**APPLICATIONS FOR TRANSFER**

**COMISKEY, John Howard, Jr.**
Assistant Director, Bureau of Traffic Engineering, Pennsylvania Department of Highways, Harrisburg, Pennsylvania—for MEMBER.

**HOLLOWAY, Frank M.**
Assistant Engineer of Traffic, Traffic & Planning Division, Florida State Road Department, Tallahassee, Florida—for MEMBER.

**LUETTICH, Richard Albert, Sr.**
Assistant Traffic Engineer, Maine Highway Department, Augusta, Maine—for ASSOCIATE.

**MASON, William Gerald**
Traffic Engineer III, Traffic Engineering Department, City of Chattanooga, Tennessee for ASSOCIATE.

## Letter to the Editor

September 25, 1961

Sir:

I would like to comment on the article by Paul Roer entitled "Pedestrian Crossovers" which appeared in the August issue of Traffic Engineering. He has stated that, according to the authorizing by-law, a motorist is not required to stop—only to yield to pedestrians. This is a misinterpretation of the by-law wording which states, "the driver shall yield the right-of-way to every pedestrian upon a pedestrian crossover, stopping if need be to so yield."

The pedestrian crossover was not introduced to give the pedestrian a device he did not need, as the author insinuates, but was installed after very much pressure from the Toronto municipalities for some device to help pedestrians to cross busy traffic arteries. If a traffic accident may be interpreted as the failure of the road user, the vehicle, or the fixed facility, then it follows that the 2,000 pedestrian accidents occurring yearly in Metropolitan Toronto indicate the need for additional pedestrian protection.

Traffic engineering deals with the safe, convenient and economic transportation of persons and goods. Too many traffic engineers interpret this to mean the efficient transportation of cars and trucks. The transportation of pedestrians should be as important to traffic engineers as cars and trucks.

The author justly criticizes the stopping distance of 30 feet from the crossover, which he feels should be 100 feet. There is no question that he is right in this; however, political pressure has made it difficult to extend this regulation, except in a few locations.

The accident statistics for Metropolitan Toronto point out the remarkable effect that the pedestrian crossover program and the safety campaign have had. In 1957, before crossovers were established, there were 2,257 pedestrian accidents. In 1959, after pedestrian crossovers had been established, there were, 1,799 pedestrian accidents, and in 1960 there were 2,009 (decrease of 248). This decrease in pedestrian accidents is all the more remarkable when it is compared with total accidents which have increased from 20,328 in 1957 to 24,482 in 1960 (increase of 4,154). However, it should not be overlooked that pedestrian accidents are on the rise again. It will be necessary to have enforcement and education campaigns on a regular basis, if pedestrian accidents are to be kept in check.

The author suggests that the onus is placed on the motorist to obey the pedestrian crossover, but not on the pedestrian. The by-law puts equal onus on the motorist and the pedestrian. However, enforcement is more difficult for the pedestrian than the motorist.

A check of the Toronto street system reveals that the total area devoted to traffic signals and pedestrian crossovers is less than one per cent of the total street area. Therefore, on only a small part of the street system does the pedestrian have the right-of-way over the motorist.

Incidentally, all pedestrian crossovers on streets having four or more lanes are being equipped with an additional overhead illuminated sign. Also, a study is being undertaken to determine the adequacy of night-time illumination at crossover locations.

The author's major point in his article is that the motorist should not have to look for a sign to indicate a pedestrian crossing, but should look for the pedestrian himself.

In theory this might seem to be the best approach to the problem. However, in practice this does not seem to work for several reasons. One of the major concerns of all traffic engineers is the uniformity of traffic control devices. Yet the motorist is expected to see the most non-uniform element of the traffic stream—the pedestrian. He comes in all shapes, sizes, ages, clothing, etc. The author argues the need for 100 foot stopping restrictions. How then is the motorist expected to stop for a child who runs out from behind a parked car? How is a motorist expected to stop for a pedestrian wearing dark clothes at night if he sees him only at the last moment?

Is it not better for the motorist to look for a uniform traffic control device than a non-uniform pedestrian?

One of the arguments against the pedestrian crossover is that the pedestrian is given a false sense of security of his right-of-way over the motorist. The wise pedestrian makes certain that each vehicle has slowed sufficiently or stopped before he crosses. The experience in Toronto has been that close to 80% of all vehicles stop for the pedestrian in the crossover. The same argument about a traffic control device giving a false sense of security applies to every control device, particularly the traffic signal. Every traffic control device should be approached with caution by the user if it is to operate safely.

Yours very truly,

/s/ M. Rotman,
Traffic Planning Engineer
Lazarides, Damas and Smith Ltd.

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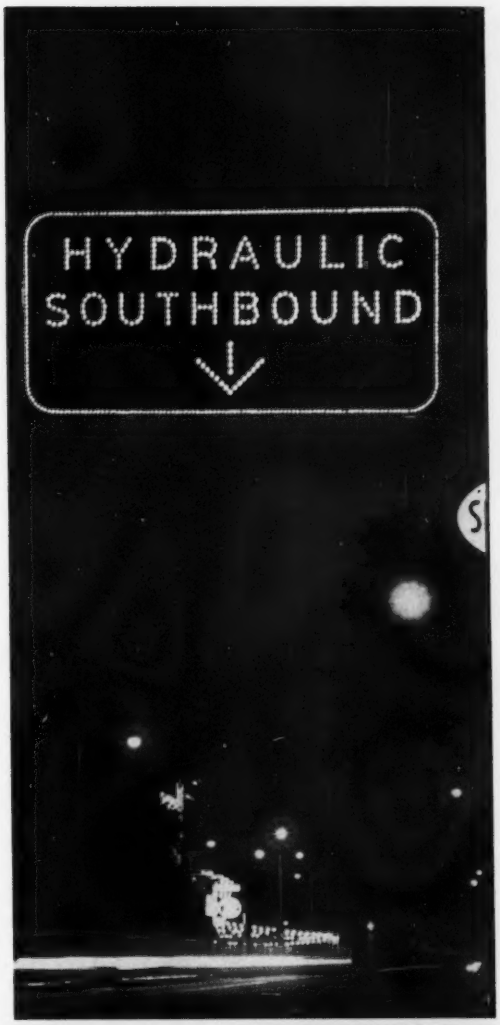


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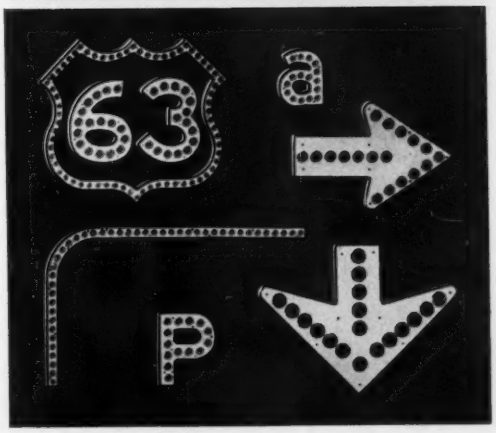


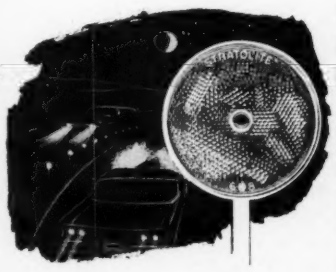

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# Technical Notes

## Traffic Signal Timing Utilizing Probability Curves

By Bruce M. Davidson
Assistant Dean, College of Engineering
University of Wisconsin

In selecting the proper cycle time based on the known traffic volumes approaching the intersection it is often inconvenient to use tables from which to establish the required green time to develop a satisfactory reliability of performance. Since the selection is by a trial and error method, graphical means of solution can speed up the process of selection.

Since the design traffic volume, when divided by the number of cycles per hour, gives only the average number of vehicles per cycle, it is necessary to inject a factor which will increase the reliability of performance above 50%. By use of statistical data based on Poissin's series one can predict the probability that X or more vehicles will accumulate within a given average interval.

Generally, if possible, about 95% reliability is preferred. That is to say, that the design of the signal system should be such that sufficient green time is allotted to traffic movements so that in 19 out of 20 cycles the intersection will be cleared of all vehicles which approached the intersection during the cycle. However, in some instances where traffic is heavy or the signal timing is predetermined in order to integrate the intersection into an existing signal system, it may not be possible to maintain design standards permitting 95% reliability. Where the cycle time is pre-determined, the available green time may be divided so as to provide the maximum efficiency under the conditions of the problem.

Figure 1 graphically shows the relationship between the average hourly traffic volume, the cycle length, and the required green time (in seconds) depending upon the desired reliability or probability level. For example, a volume of 360 vehicles per hour through an intersection requiring a 60 second cycle would require, on the average, green time to take care of six vehicles. However, the number of vehicles approaching an intersection during a complete cycle varies and therefore it is necessary to consider the probability that queues of greater than six vehicles will approach the intersection. Those vehicles in queues in excess of six vehicles will be delayed unless the green time is extended. By using probability curves it is possible to ascertain the required green time to provide for these queues of varying length. In the example, if 26.8 seconds of green time were allotted, it would accommodate eleven vehicles. Queues of greater than eleven vehicles occur only 5% of the time and hence the allotted green time permits the intersection to clear itself of vehicles with delays of less than a cycle 95% of the time.

The following are typical problems which are solved by the use of Figure 1:

*Problem #1* Given: 400 veh/hr in E-W direction. 300 veh/hr in N-S direction. If required to use a 60 second cycle, what is the % efficiency of the intersection?

Solution: By use of Figure 1 move to the right on the 400 V/hr line and then down from its intersection with the 60 sec. cycle line to the 95% probability line and then left to the average requirement for green time which happens to be 28.9 seconds. Following the same procedure for the 300 V/hr volume we find that 24.7 seconds of green were given. If 6 seconds of amber are added in order to clear the intersection (3 sec for each phase) the total is 59.6 seconds. This intersection can therefore operate on a 60 second cycle with traffic volumes split 400/300 veh/hr at 95% reliability utilizing the time as shown above.

*Problem #2* Given: The traffic in Problem #1 is increased to 500 and 400 veh/hr. (It is obvious that a 60 second cycle cannot produce 95% reliability under these terms). Find the reliability for the above conditions. Enter the graph from the 500 veh/hr line and drop down from its intersection with the 60 sec. cycle line until the 28.9 second line (see result from Problem #1) is intercepted. This point falls midway between the 80% and 90% curves for an estimate of 85%. For the 400 veh/hr the intercept point on the 24.7 sec. line also falls at about the 85% curve. Reliability is therefore 85% for both directions.

*Problem #3* Given: The volumes in Problem #2 are increased to 600 and 500 veh/hr. What is the reliability of performance?

Solution: The intercept points now fall on the 70% and 65% reliability curves respectively. Therefore, increased volumes with fixed cycle times result in reduced reliability ratings.

*Problem #4* Given: Solve Problem #2 establishing 95% reliability as a requirement.

Solution: Assume a 70 second cycle and repeat the process. The required green time to handle 500 and 400 vehicles is 36.2 and 31.0 seconds respectively. After adding six seconds of amber to clear the intersection, it is noted that 73.2 seconds are required. Since only 70 seconds are available, the solution is not acceptable. By assuming an 80 second cycle the required times become 40 and 34 seconds which, when added to the six seconds of amber, total 80 seconds. Therefore, an 80 second cycle will handle 500 and 400 veh/hr at 95% reliability.

In some instances, where low vol-

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Traffic Engineering, published monthly at Plainfield, New Jersey, for November, 1961.

1. The names and addresses of the publisher, editor, managing editor, and business managers are:
Publisher, Institute of Traffic Engineers, Inc., 2029 K Street NW, Washington 6, D. C.
Editor, David M. Baldwin, 2029 K Street NW, Washington 6, D. C.
Managing editor, Rebekah Friebely, 400 Watchung Ave., Plainfield, New Jersey.
Business manager, None.

2. The owner is: Institute of Traffic Engineers, Inc., 2029 K Street NW, Washington 6, D. C.

3. The known bondholders, mortgagees, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages, or other securities are: None.

5. The average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the 12 months preceding the date shown above was: 3800.

REBEKAH FRIEBELY
(Managing editor)
Sworn to and subscribed before me this 21st day of September, 1961.
[SEAL]
WILLIAM L. CHRISTIAN
(My commission expires April 8, 1963)

DESIGN CAPACITY – VEH. PER HOUR
562
541
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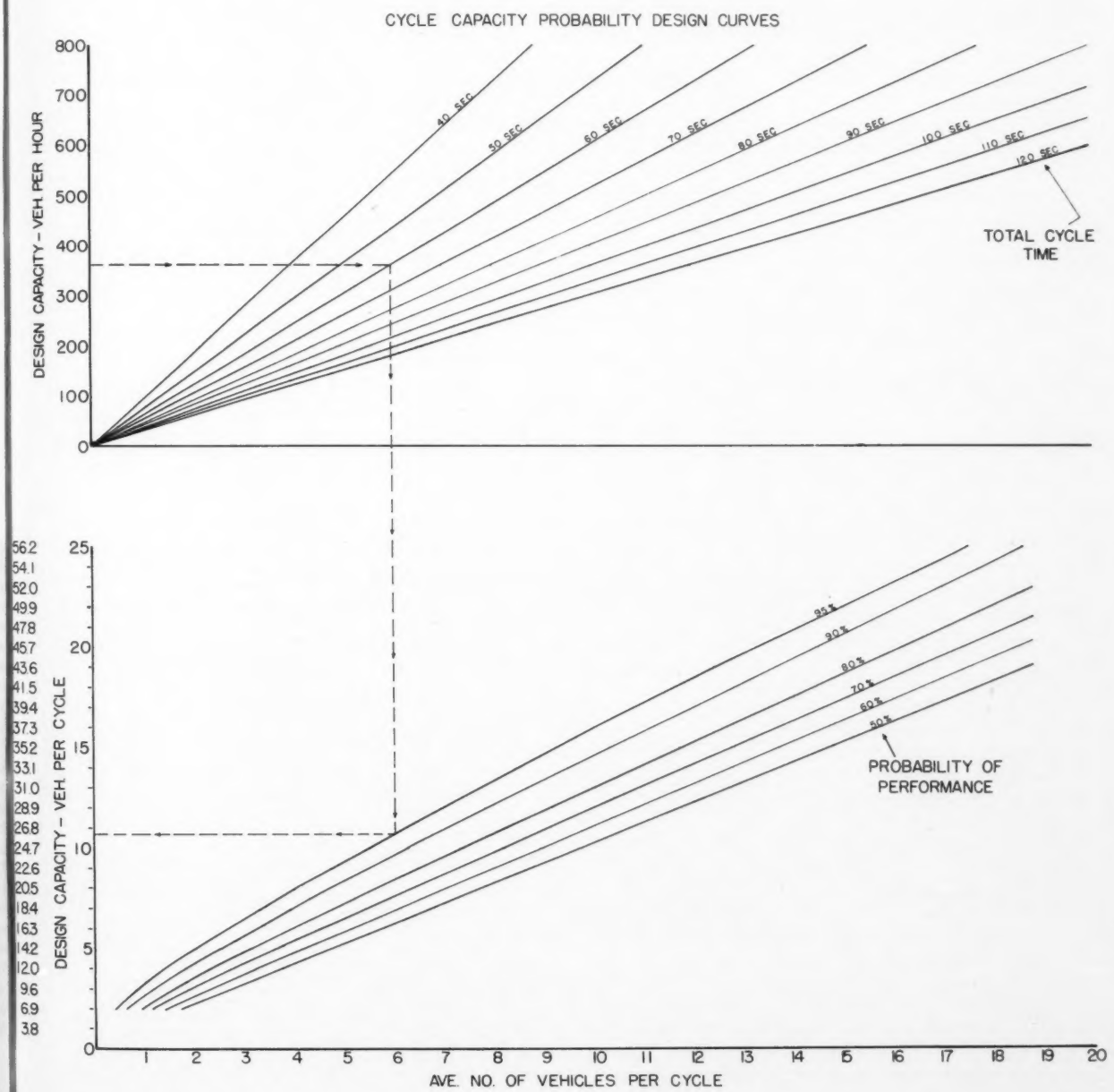
umes of traffic are involved it is important to remember that the pedestrian may be the controlling factor in deciding the amount of green time required. (Pedestrians require time at a rate of approximately .25 sec. per foot of street width plus 4 seconds to clear the curb). Nor is it necessary to require the same degree of reliability for each approach. If in Problem #3, the traffic volumes were 700 and 300 veh/hr. and if 95% and 70% reliability are acceptable limits, then the solution to this example for a 60 second cycle requires 41.5 seconds on the main street which leaves 13.5 seconds for the cross street with 6 seconds of amber to clear the intersection. Depending upon the width of the main street 16.5 seconds (13.5 green + 3 sec. amber) may be insufficient time for pedestrians to cross. If a 70 second cycle is selected, the time allotments increase to 46.5 and 17.5 seconds respectively. This should be enough to provide adequate pedestrian time.

One further point. The graph provides an excellent method of timing independent signals for traffic volumes which fluctuate during the day. It is possible to develop 95% reliability for mainstreet traffic with reduced reliability for side street traffic which may be less critical during rush hours and provide for an equal level of reliability during off-peak hours where side street traffic may be as important as main street traffic. In Problem #3 a main street volume of 700 vehicles/hr can be handled with 95% reliability with side street traffic accommodated at 70% reliability. During other hours of the day the volumes would be different and the 70 second cycle could be divided to give equal consideration in terms of reliability to both streams of traffic as was provided for in Problem #2.



## Technical Council News

### New Appointments Made in Technical Council

Mr. Carlton C. Robinson has been appointed Chairman of the Technical Council by President Malo. As reported last month, the Board of Direction agreed with the recommendation of the Council to make the position of chairman a long term appointment of at least three years duration. In the past the technical vice-president, who changes each year, has served as chairman. However, the nature of the Council's work requires greater familiarity than can be acquired in a one-year period. The Technical Council expects to become an ever more vital activity of the Institute under this new arrangement, which will be initiated by Mr. Robinson.

With the approval by the Board of Direction of Department 8, "Characteristics of Traffic and Traffic Movement," Mr. Matthew J. Huber has been appointed Department Head. Mr. Huber is well known for his presentation of characteristics to students attending the Yale Bureau of Highway Traffic. As a Research Associate at the Bureau, Mr. Huber is well qualified to project the Technical Council into an area which has not been specifically assigned to any one department in the past.

Another appointment of importance is the new Head of Department 3, "Traffic Operations Measures," Mr. William R. McGrath. With his experience as Director of the Department of Traffic and Parking in New Haven, Connecticut, Mr. McGrath is expected to add new vitality to this long standing department of the Technical Council.

The appointment of Mr. Robinson as Chairman creates a vacancy in Department 2, "Professional Standards, Education and Administration." A new head for this department is being sought, but in the meantime Mr. Robinson is continuing to carry on the work of Department 2.

### 1961-62 Project Committees

The projects have been defined and the final appointments are being made to the technical committees which will be active during 1961-62. As can be seen from the list which follows, the areas to be covered by the committees are quite diversified. In each case the title of the committee project and the name of the chairman is given.

2B(61)—Performance Evaluation—Martin A. Wallen

2F(61)—Present and Future Need for Professional Traffic Engineering Personnel—Ross T. Shoaf

2H(60)—Traffic Engineering Functions — Joseph C. Oppenlander — This committee will undertake a new phase of this project in 1961-62

4D(61)—Red and Yellow Arrow Signal Indications—Richard A. Walons

4E(61)—Flashing Green, Amber and Red Signal Indications—John E. Hartley

4A(60)—Pedestrian Control Warrants and Procedures—Stanley T. Siegel—This committee is being carried over from 1960-61.

6A(61) — Planning Criteria for Traffic Ways — Raymond C. Bergendoff—This committee has been reorganized and is considered as being a new one

6B(61)—Capacities and Limitations of Urban Transportation Modes — Louis E. Keefer

6C(61)—Arterial Street Standards as Related to Urban Renewal Projects —John D. Edwards, Jr.

7C(61)—Flashing Electric Lanterns for Barricades—Karl A. Bevins

7E(61) — Traffic Signal Heads — Wayne N. Volk

7B(60) — Traffic Signal Colors — Charles S. Michalski—This committee and the following one are being carried over from 1960-61

7D(60) — Traffic Signal Lamps — Walter J. Addison

The objectives and scopes of these committees were published in the June, August and October issues of *Traffic Engineering*. Anyone wanting additional information should contact the Heads of Departments 2, 4, 6 or 7, C. C. Robinson, S. Cass, D. S. Berry or M. S. Hensley respectively.

Except for those mentioned above which are being carried over, all other committees from the 1960-61 committee year are scheduled to submit reports in time for review by the Technical Council at its January meeting. As soon as the reports are submitted the committees will be discharged.

The process whereby a committee is appointed to do a specific project, upon the completion of which it is discharged, is in accordance with the procedures adopted by the Technical Council several years ago at the Miami meeting.

OPERATIONAL CONTROL

*(Continued from page 17)*

Appreciation is in order to the Norwalk Police Department for their assistance in the installation of the equipment on the Turnpike, and particularly to my co-workers at Automatic Signal for a more than their line of duty effort to make equipment available in time for field testing.

Special appreciation is due to Mr. Matthew Huber, Associate Professor at the Bureau of Highway Traffic at Yale University for his suggestions in evaluating the data, help in regard to proposed tests relevant to the confidence level of the data, and patience in the preparation of the paper.

The author expresses his sincere gratitude to the officers of Automatic Signal Division for their indulgence in a specific project, many times at the sacrifice of more pressing industrial problems, and for their financial support in sponsoring this program.

POSITIONS AVAILABLE

*(Continued from page 38)*

### CONSULTING FIRM

Position: Traffic and Transportation Planning Engineer to direct traffic and transportation surveys, engineering and report writing for highway projects and urban transportation systems, studies, and analyses, for established firm of engineers and architects. Opening in firm's Traffic Division, Cincinnati, Ohio.

Requirements: Civil engineering graduate, with graduate education in traffic engineering or equivalent experience in traffic and transportation planning, plus three years responsible charge in the planning and directing of Traffic and Transportation programs. Some highway engineering experience desirable.

Salary: To $10,000 a year, depending upon experience and qualifications.

---

Position: Assistant Traffic Engineer in the Highway Planning and Transportation Department — Diversified assignments in traffic and transportation planning, origin-destination surveys, traffic studies and related subjects—Openings in firms at Cincinnati, Ohio and San Antonio, Texas.

Requirements: Civil Engineer graduate with actual traffic experience adequate to conduct traffic engineering studies, or Civil Engineer with graduate education in traffic engineering without experience. Must be available for some field assignments.

Salary: Minimum starting salary, $6,000 per year, adjustments depending on previous experience.

Apply: Send personal resume and availability in first correspondence to Vogt, Ivers and Associates, 34 West Sixth Street, Cincinnati 2, Ohio.

### NEW YORK CITY

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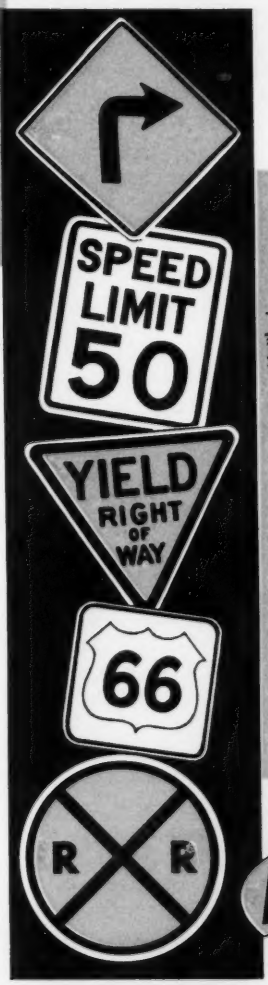


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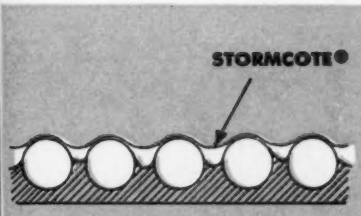


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Salary: $7450-$9250 with yearly increases to the maximum. New York City residence NOT required.

Apply: New York City Department of Traffic, 100 Gold Street, New York 38, New York.

---

Position: Senior Highway Transportation Specialist to act as a group chief within the joint City-State Highway Transportation Study program in charge of a major unit.

Requirements: A baccalaureate degree plus completion of one academic year of advance study on the graduate level majoring in urban traffic operations or characteristics, highway transportation analysis or economics, or traffic research, plus three years of progressively responsible experience in these specialized fields; or
a baccalaureate degree plus five years of responsible experience in the above fields.

Salary: $9000-$11,100 with yearly increases to the maximum. New York City residence NOT required.

Apply: New York City Department of Traffic, 100 Gold Street, New York 38, New York.

### DEPARTMENT OF HIGHWAYS, ONTARIO

Position: Current Studies Engineer in the Traffic Engineering Section, to supervise an engineering unit carrying out traffic planning studies.

Requirements: Graduate Engineer, eligible for registration in Ontario. Traffic engineering experience required.

Salary: Commensurate with experience.

Apply: Personnel Branch, Department of Highways, Ontario, Parliament Buildings, Toronto, Ontario, Canada.

## Section News

### MISSOURI VALLEY SECTION

The Missouri Valley Section was saddened by the death of Leon Corder, past President and Charter member of the Section.

Personnel changes in the Missouri Valley Section:

Al Acton has left the City of St. Louis to become Traffic Commissioner of the City of West Palm Beach, Florida.

Chun Hyung Cho, formerly a Civil Engineer with the Wichita City Engineering Division has transferred to the Traffic Engineering Division.

Frank L. Watson, formerly with the Traffic and Transportation Department at Houston, Texas has joined the Wichita Traffic Engineering Division as Assistant Traffic Engineer.

George Fisher has left his position as Director of Public Works to become Deputy Director of the Pollution Control Department, City of Kansas City, Missouri.

Mr. Jim Straughan has joined the staff of the Traffic Engineering Section of the Nebraska Department of Roads. Jim is a Civil Engineering graduate of the University of Colorado and has obtained his masters degree this past June from the University of California Institute of Transportation & Traffic Engineering.

The Missouri Highway Department reports the following appointments in the Traffic Engineering Division. Mr. Frank Stuckey has been appointed Traffic Engineer and Mr. Kenneth Townley has been appointed Assistant Traffic Engineer. Both Mr. Stuckey and Mr. Townley have been closely associated with Traffic Engineering work because of their previous service as Maintenance Engineers in the Missouri Highway Department.

Seward Cross and Harold Bastin have left the Traffic Engineering Division of the Kansas Highway Department to work in the Traffic Engineering Department in Kansas City, Missouri.

A special meeting of the Missouri Valley Section was held in Jefferson City, Missouri on July 21 to tabulate the vote of the section members on a new Charter and By-Laws. The new Charter and By-Laws were adopted by a nearly unanimous vote.

A meeting was held at Washington, D. C. on August 21. The members were advised that the Board of Direction approved the new MOVITE Charter and By-Laws as an amendment to the MOVITE Constitution. The members present also expressed their approval of the transfer of Oklahoma from District 5 to District 4.

Plans are being made by Hank De Noble for a MOVITE meeting in Little Rock, Arkansas on March 3, 4, or 5 in conjunction with the Southern Safety Conference.

### NEW YORK METROPOLITAN SECTION

The next meeting of the New York Metropolitan Section is scheduled for Tuesday, November 28, at the Essex House in Newark, New Jersey. The meeting will start at 6 p.m. with a business meeting, followed by dinner at 7:30 and a program starting about 8:30 p.m. George Leland, of Edwards and Kelcey, will discuss his firm's Newark transportation study, which has just been completed.

The Section has scheduled following meetings for January 17, February 15, March 29, and the annual business meeting on June 5.

### PUERTO RICO SECTION

New officers of the Puerto Rico Section were elected at the Section meeting on August 18, as follows:

President—Juan F. Vives-Meléndez; Vice President—William Vivoni, Jr.; Treasurer—Wilfredo Vásquez-Rivera; Secretary—Edwin Cuebas-Morales, c/o Bureau of Traffic, Department of Public Works, Santurce, Puerto Rico.

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"What people say behind your back is your standing in the community."
*—Edgar Watson Howe*

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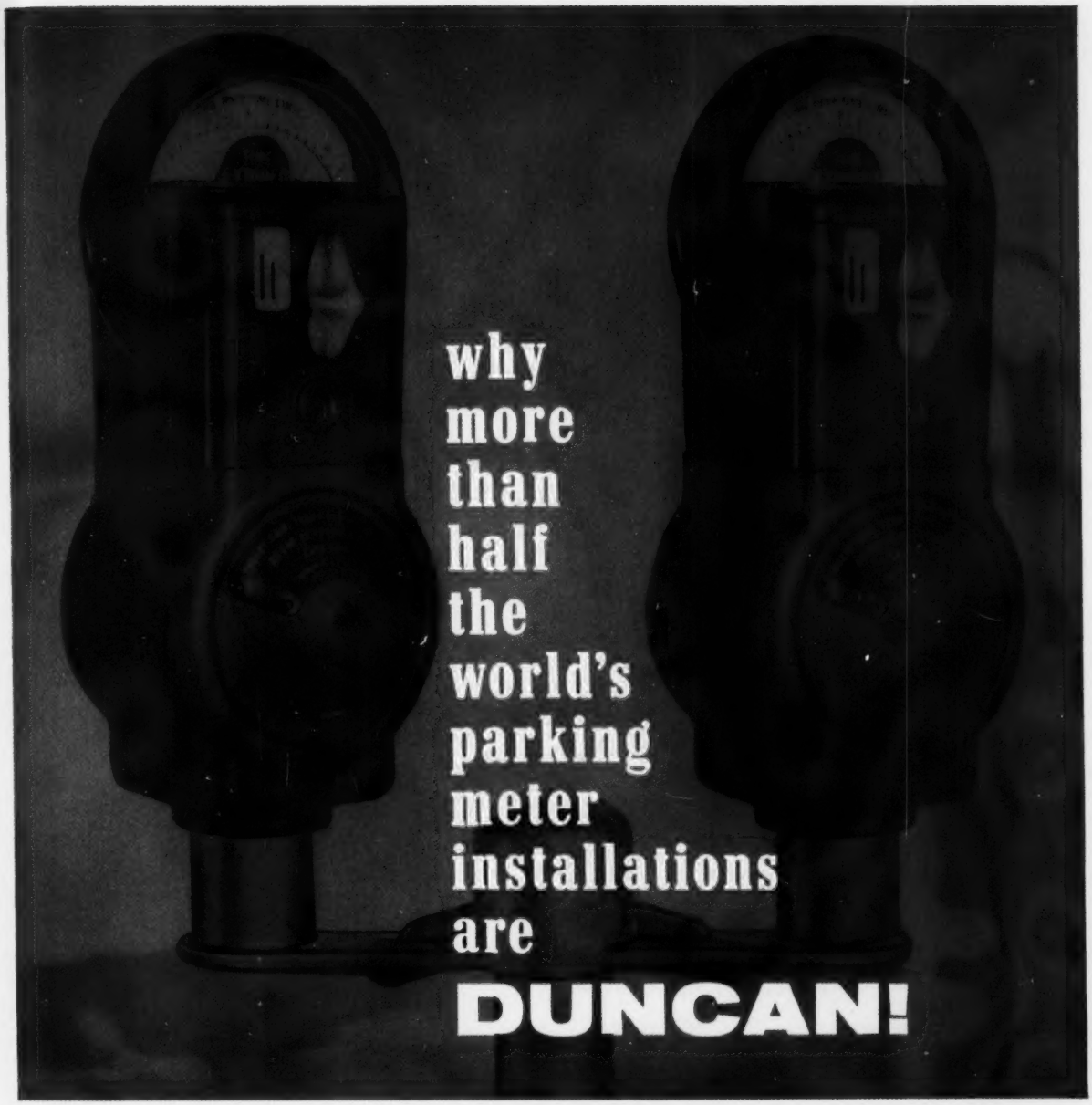
"A learned blockhead is a greater blockhead than an ignorant one."
*—Benjamin Franklin*

### Howard E. Irby

Howard E. Irby (Associate Member, ITE) died October 5, 1961, after a long illness. At the time of his death, he was Associate Professor of Civil Engineering at the University of Missouri in Columbia, Missouri, a position he had held since 1954.

Professor Irby had previously taught at the University of Oklahoma and had been in private engineering work for several years. A graduate of the University of Oklahoma, he held a Master of Engineering degree from Yale University, and had done summer work at the University of California.

Professor Irby was a Member of the American Society of Civil Engineers, a member of the American Society of Engineering Education, and a registered professional engineer in Missouri and Oklahoma. He was an active member of the Missouri Valley Section of the Institute of Traffic Engineers, and had been a prime mover in the traffic engineering conferences held at the University.

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When citizens of St. Louis County, Missouri, saw easy-to-read street name signs going up, they liked the idea. "Not one complaint," says County Highway Engineer John J. Leslie...

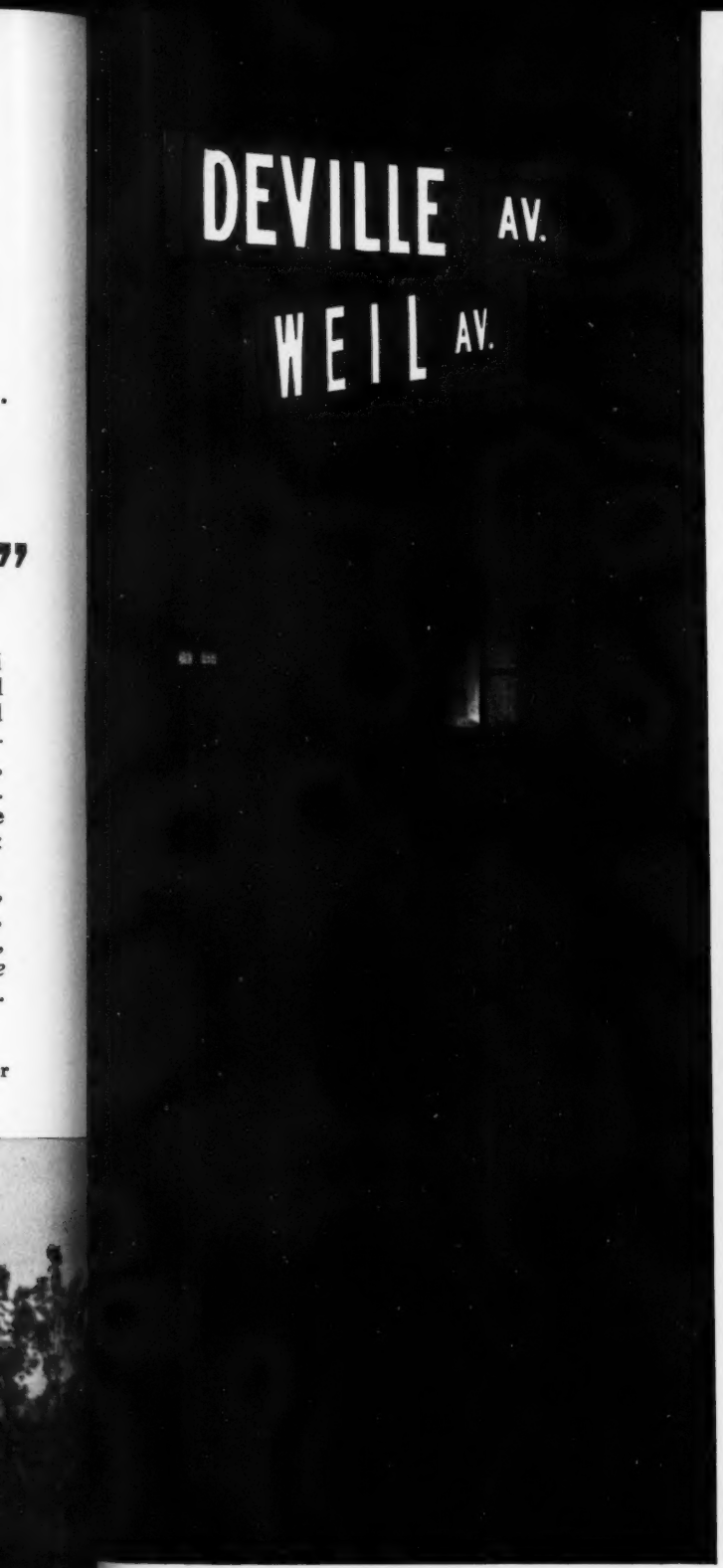
# "THE TAXPAYERS FAVOR THIS STREET SIGN PROGRAM 100%!"

In late 1958 the St. Louis Metropolitan Traffic Engineers launched a drive for uniform, more readable street and road name signs throughout the area. A model sign of green and white reflective sheeting was proposed by St. Louis County and adopted.

As the new signs began to show up, there was favorable public comment. County Highway Engineer Leslie recalls that the people liked what they saw. The signs, reflectorized with "Scotchlite" Sheeting, were easier to read, especially at night. "As a result," Mr. Leslie says, "every penny spent has been enthusiastically endorsed by our taxpayers."

The City of St. Louis and the Missouri Highway Department also began to install uniform white-on-green signs at corners and intersections. In addition, over 20 local municipalities took part in the program. Here, too, public response was immediately enthusiastic. The St. Louis County municipalities with the latest look in street name signs include: *Bellefontaine Neighbors, Berkeley, Crestwood, Ferguson, Florissant, Hazelwood, Kirkwood, Lakeshire, Marlborough, Moline Acres, Olivette, Overland, Peerless Park, Richmond Heights, Rock Hill, Shrewsbury, Sunset Hills, Sycamore Hills, University City, Wilbur Park, Winchester.*

**COUNTY TRAFFIC COMMISSIONER** Daniel J. Hanson (left) and Shrewsbury Street Commissioner Edmond Flavin examine one of the new street assemblies made with "Scotchlite" Reflective Sheeting.



**MAYOR WALTER L. MEYER** (above) of Bellefontaine Neighbors, Missouri, says, "People like to see where their tax dollars are going. Our community is all for this street sign program."

**MAYOR GEORGE HELMSING** of Shrewsbury, Missouri, exclaims, "So satisfied are we with our new reflectorized street name signs, we now plan to reflectorize all our Stop signs and city entrance signs."

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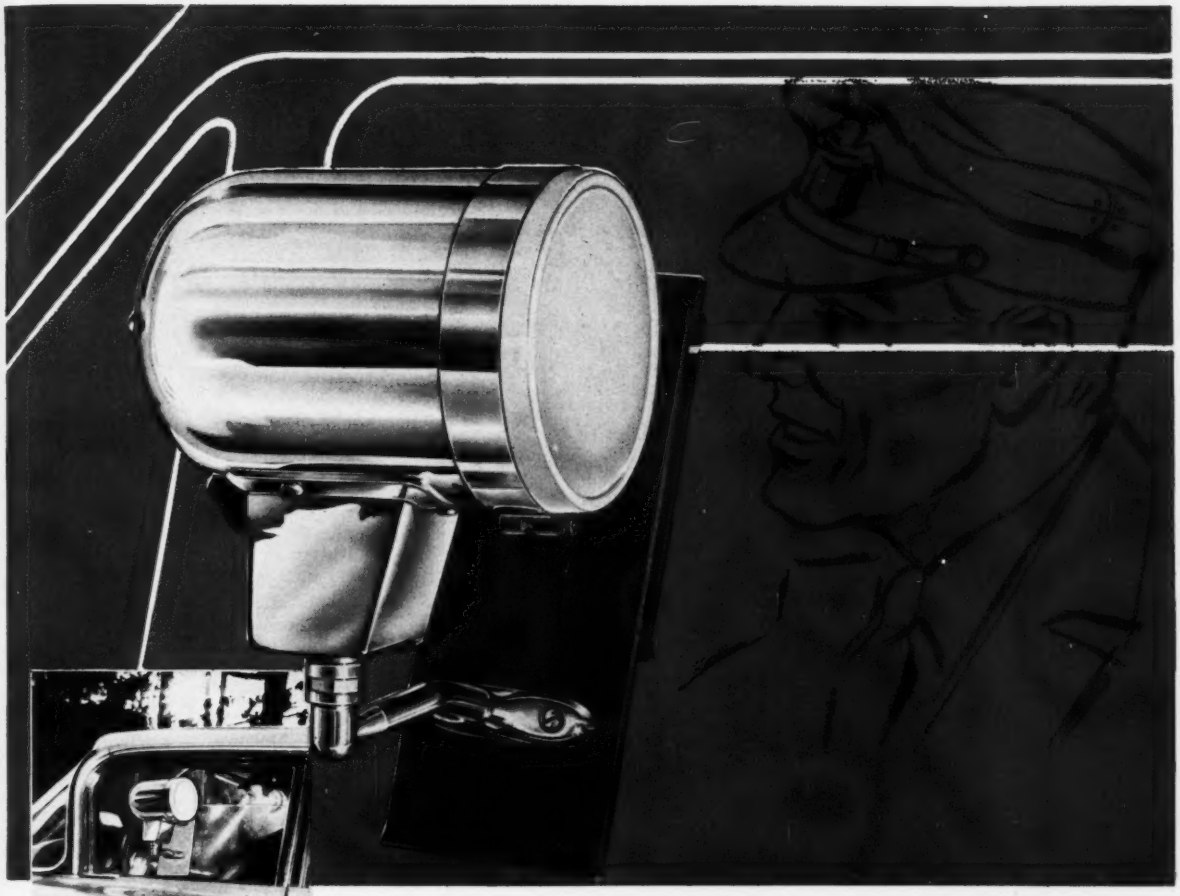

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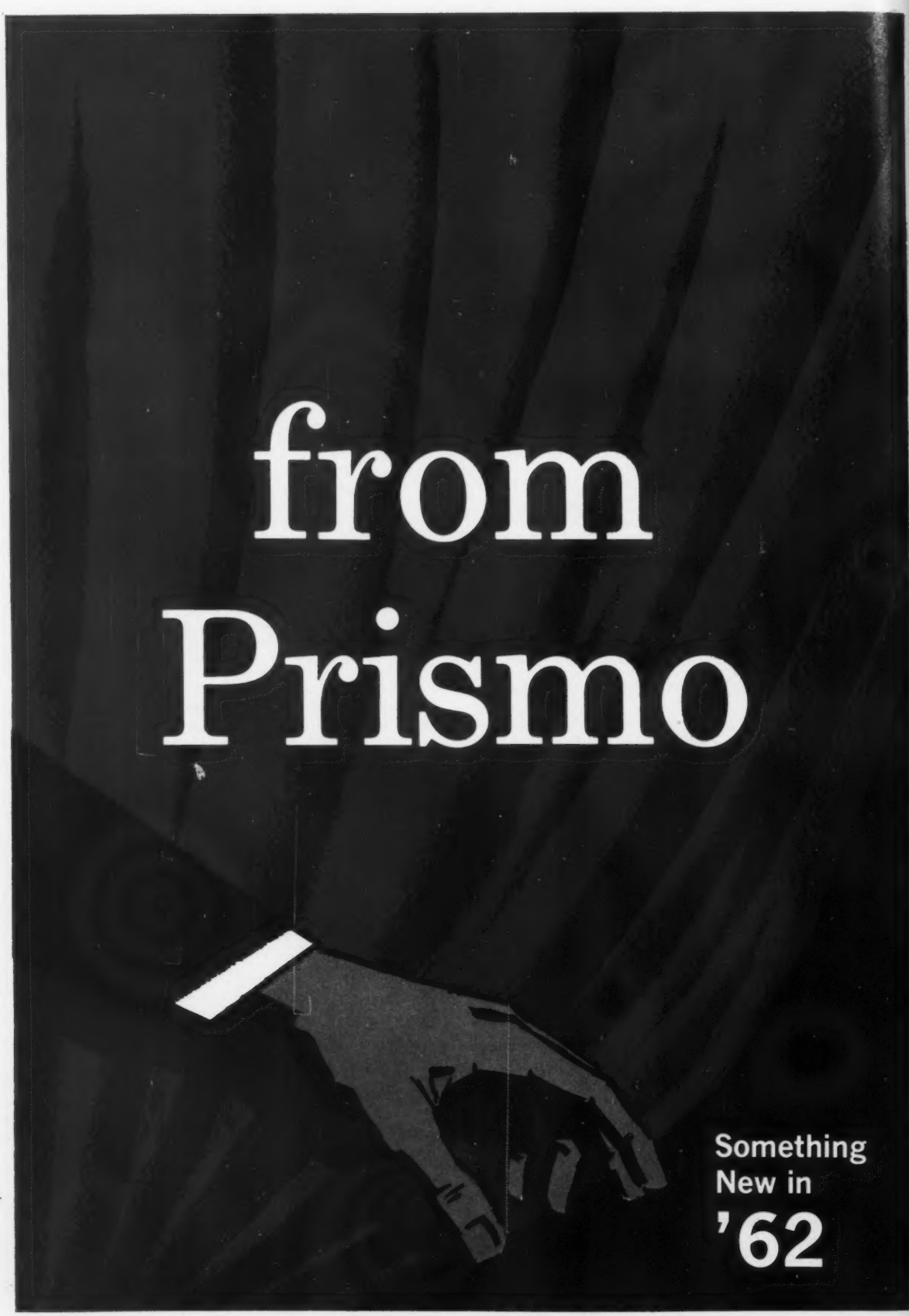
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